

MARCH 21, 1955

What Is a Subsidy, Anyway? . . . p. 49

RAILWAY AGE

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Two ACF Cars

What Gains

From Computers?

"Cumulative"

Maintenance Costs

Report of AREA

Convention

Proceedings and

Digest of

Addresses and

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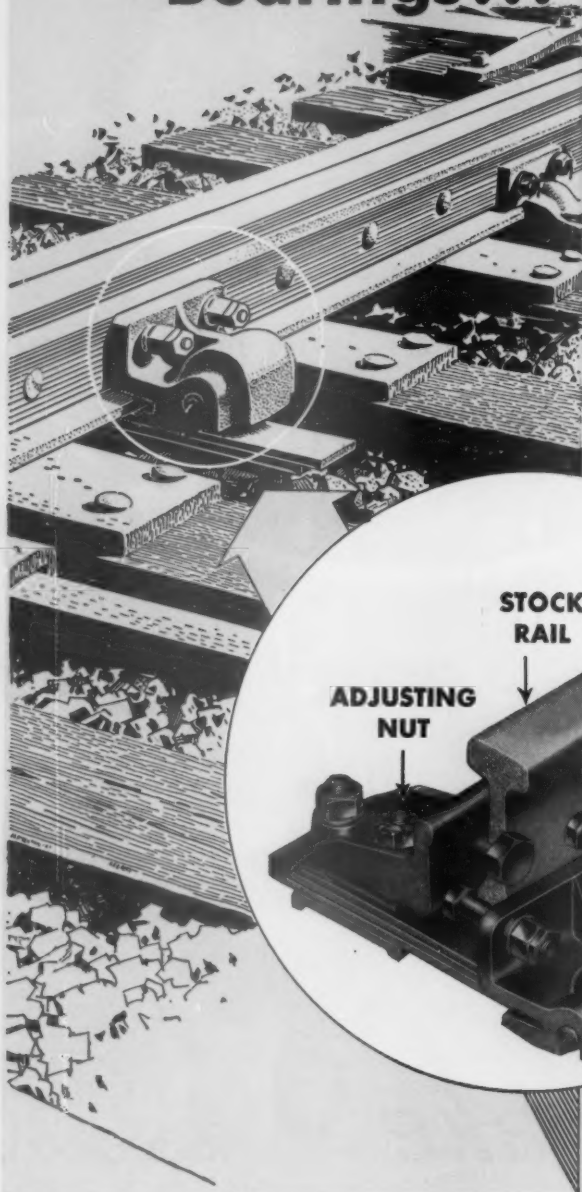
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March 21, 1955

Vol. 138, No. 12

Week at a Glance

Diversified traffic is what American railroads need now more than ever before, the C&O's M.I. Dunn told the American Railway Development Association's recent annual meeting. 10

"Secret weapon" in cutting costs and delays — that's what Wabash Vice-President Clarahan calls "piggy-back." He was one of an imposing line-up of speakers at last week's "Railroad Night" meeting of the Motor City Traffic Club. 12

The "Griffin plan," or some other means to concentrate traffic on rails, was urged on New England shippers attending the regional advisory board meeting in Hartford. 13

FORUM: What Is a Subsidy? The question brings a diversity of answers from transportation men, but in this diversity there is distinction without fundamental difference, we venture to suggest. 49

Squeeze tests on two ACF passenger cars, one of aluminum alloy superstructure and one of stainless steel, were run recently at the AAR Research Center. Results are reported herein. 50

Gains from use of electronic computers include better control of operations, less costly paperwork, and enhanced ability to meet competition. What various industries, including an important railroad, are learning about this spectacular recent development in data processing was impressed on a special American Management Association conference. 52

Faster tempo for engineers was the theme of last week's 54th annual meeting in Chicago of the American Railway Engineering Association. 54

Highlights of the AREA committee reports and technical

Current Statistics

Operating revenues, one month	
1955	\$752,741,347
1954	749,825,835
Operating expenses, one month	
1955	\$590,002,298
1954	626,006,095
Taxes, one month	
1955	\$ 74,547,270
1954	71,488,503
Net railway operating income, one month	
1955	\$ 68,660,196
1954	32,545,876
Net income, estimated, one month	
1955	\$ 52,000,000
1954	20,000,000
Average price railroad stocks	
March 15, 1955	88.26
March 16, 1954	61.46
Carloadings, revenue freight	
Nine weeks, 1955	5,758,832
Nine weeks, 1954	5,541,827
Average daily freight car surplus	
Wk. ended March 12, 1955	43,104
Wk. ended March 13, 1954	129,260
Average daily freight car shortage	
Wk. ended March 12, 1955	1,399
Wk. ended March 13, 1954	197
Freight cars on order	
February 1, 1955	18,395
February 1, 1954	27,959
Freight cars delivered	
One month, 1955	2,008
One month, 1954	4,944
Average number railroad employees	
Mid-January 1955	1,009,746
Mid-January 1954	1,107,995

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Week at a Glance CONTINUED

sessions are an index of the inclusiveness and depth of the professional interests of the railroads' engineering and maintenance personnel. **57**

"Cumulative" maintenance costs on diesels can be very misleading statistics, says our contributor H. F. Brown, who uses figures and graphs to develop his argument. **66**

Railroads' "inherent advantage" in economical handling of large shipments was recognized by the ICC in a minimum-rate order under which trucks can't match a 60,000-lb minimum rail rate—but ironically an almost simultaneous Division 3 finding gives the trucks parity on one-third the railroad minimum load. **71**

BRIEFS

Possibility of using helicopters in place of trains in outlying areas is reportedly being studied by the Lackawanna. Such service, it is thought, might provide a solution to the problem of maintaining branch lines for a relative handful of commuters.

"It is physically and financially impossible for railroads to absorb more than a very small portion of highway grade crossing separation costs," Robert W. Walker, general attorney for the Santa Fe, told the Western (Continued on page 7)

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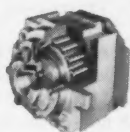
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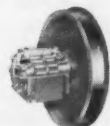
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on highway over-passes. This way, you will be taking advantage of the \$1,000,000 Hertz spends every year in leading national magazines to advertise the Rail-Auto Travel Plan.

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Week at a Glance CONTINUED

Conference of Railway Attorneys recently. He termed the 1953 Supreme Court decision upholding a 50% assessment against his road for a California separation "inequitable," and, pointing to that state's proposed separation projects totaling over \$200 million, he said: "The fair way to approach this problem is to appportion costs of necessary separations on the basis of benefits received."

Purchase of the 37-mile "Shore Line" suburban route of the Chicago North Shore & Milwaukee is reported to be under serious consideration by a group of private investors. Abandonment of the line, approved by the Illinois Commerce Commission, is now before the ICC. Existence of the investor group—which apparently would continue to operate the line—was revealed at a recent Illinois commission hearing on a North Shore Line proposal to substitute bus operation.

More types of locomotives were built by the General Electric Company in 1954 than in any previous year. The company manufactured last year 40 different kinds of motive power, both for surface work and underground service.

A new method of "flashing" signal bonds onto railroad rails has been developed by the American Steel & Wire division of United States Steel Corporation, the Nelson Stud Welding Company, and AGA (Svenska Ab Gasaccumulator) of Stockholm, Sweden. Trade name of the new method is "Tiger-braze."

That railroad stocks are attractive, even to conservatively managed investment funds, is indicated by the \$400-million Wellington Fund's 1954 annual report. The fund's invest-

ment in railroad stocks at the year end was \$13,206,500, up \$3,488,875 over the mid-year figure. Good earnings outlook for rail stocks was the reason given for the increase.

Wider promotion of the rail-auto travel plan will result from a contract just announced between the Pennsylvania and the Hertz Rent-a-Car System. The PRR is extending Hertz service to 46 communities in 11 states.

With fanfare and jubilation reminiscent of Toledo's Union Station opening several years ago, the city of Cleveland officially opened its new \$30-million rapid transit line between Windermere and Cleveland Union terminal on March 15. The line largely parallels the Nickel Plate and utilizes many structures provided for rapid transit when the terminal was built back in the 1920's. By summer, operation will be extended to the west side of the city for a total route distance of 13.3 miles. Further extension—including a "loop" line beneath the downtown district—are planned for the near future

"I'll be Boston & Maine president, too," after the April 13 meeting of stockholders, Patrick B. McGinnis, New Haven president, has predicted. Speaking at Williamstown, Mass., he said there is no question that some of his associates, who say they hold about 42% of B&M stock, will control the railroad after the annual meeting. All, of course, is subject to ICC approval, he added.

\$30,000 a month for rent! That's about what the Pennsylvania will pay International Business Machines for the largest "giant brain"—type 705—the latter can deliver. This new addition to the PRR family, when delivered, is expected to make available additional information of great value in guiding decisions and making possible quicker action in operation of the railroad.

Subsidy for Passenger Service?

ICC Chairman Mitchell raises question with suggestion that something like agriculture's "support price" may be the only way to solve deficit problem—Says loss has effect of raising coal rates 7%

Chairman Richard F. Mitchell of the Interstate Commerce Commission has suggested that "perhaps the only way to eliminate the passenger deficit would be to find some method of subsidizing the needed passenger service."

In a March 17 address before the Allegheny Regional Shippers Advisory Board at Pittsburgh, Pa., the commission chairman revealed that he recently made this suggestion to a professor who replied that he was "against subsidies in principle." Chairman Mitchell, as he reported it, then had this to say:

"Well, so am I. Let's call it, as we do out in the agricultural part of the country, 'support price.' 'Support price' is a far better sounding term than 'subsidies,' or maybe it could be done by lowering taxes on passenger terminals."

Freight Shippers Pay—Mr. Mitchell went on to say that no one should get the idea that passenger trains are not now subsidized. He added that "they are . . . by all shippers of freight."

Earlier in his address, he said the ICC "knows that the coal people of the nation, confronted with financial difficulties and troubles, are today paying 7% more than would be necessary if it were not for the passenger deficit." Noting that the 1954 passenger deficit was about \$700 million, the

commission chairman also said that this amount "must be made up by excessive charges to other shippers, such as the coal people, the farmers, and others."

Getting into a discussion of his views regarding regulation, Mr. Mitchell emphasized that he was speaking as an individual, not for the commission. He advocated again the seven changes which he favors to bring regulation "up to date" (*Railway Age*, March 7, page 14). On the list are his proposals to repeal section 22, limit the so-called agricultural exemptions to truck movements from farms to primary markets, and regulate private carriers to end the advantage they now have over common carriers.

Not De-regulation — Answering statements to the effect that he is for "de-regulation," Chairman Mitchell said that "at no time, nowhere," has he ever advocated "complete abolishment of regulation." He would "change the laws and interpretations to meet the conditions in the transportation industry as they are today, not as they were 30 years ago." He thinks that calls for a combination of "de-regulation" and "changes" favored by those who claim to be against "de-regulation." He summed it up this way:

"Eliminate all unnecessary regulatory laws as to common carriers and regulate all competing transportation

industries not now regulated. Make regulation fair to all. Today we regulate only as to the common carriers of the nation. We limit their operation, and we have petty regulation that is troublesome and expensive."

Referring to a recent speech by a railroad president, which was interpreted as a statement in opposition to "de-regulation," Chairman Mitchell said "the worthy president advocated far more de-regulation than I ever have." He added: "So it doesn't seem to make much difference what you say you are for. With the exception of those who are thinking of the past, there seems to be the accepted view that regulation should be brought up to date."

Rate Regulation—As to rate regulation, the ICC chairman said he is "convinced that if there were no regulatory body to control rates it would not be long before the various segments of the industry would drive each other out of business."

Previously, however, Mr. Mitchell had expressed his view that the commission should have acted more expeditiously in rate cases of the past. "The delay in giving consideration to and the granting of increased rates to common carriers, both rails and trucks," he said, "has cost these common carriers hundreds upon hundreds of millions of dollars. There is no known way to retrieve the money; it is gone."

Johnson Calls Attacks On IC Act "Loose Talk"

Interstate Commerce Commissioner J. Monroe Johnson said recently that attacks on the Interstate Commerce Act as "outdated" and "antediluvian" amount to "loose talk," some of it coming "from people in high places."

The commissioner, who was director of the Office of Defense Transportation in World War II, made this statement in an address to the class of the Ninth Rail Transportation Institute of the American University, Washington, D.C. Major General F. A. Heileman, retired, who was formerly chief of transportation of the Army, is director of the institute.

The "quick answer" to attacks on the act, Colonel Johnson said, is to point out that "transportation in the United States is so superb that none other is worthy to be called second." He added: "We must conclude that there was in 1887 wise legislation and that the Interstate Commerce Commission has administered it wisely. Otherwise, there wouldn't be such good transportation under private ownership."



NEW YORK CENTRAL'S fleet of seven fast freight trains from the midwest to important eastern markets will be known as "Early Birds." Alfred E. Perlman (right), NYC president, here presents 28-year-old railroad telegrapher Harold J. Porter with a \$500 check for suggesting the winning name. More than 20,000 suggestions for names were submitted by NYC employees.

The commissioner went on to say that the 1887 act was "totally rewritten" in 1906, 1920 and 1940, and that motor carriers were not regulated until 1935. He also noted that the commission makes legislative recommendations each year in its annual report. He conceded that the act needs "constant repair," but he also had this to say:

"No one contends that the Ten Commandments are not up to date, though some might like to change some of them for their own comfort."

Diesels and Car Use—Discussing transportation for war, Colonel Johnson expressed his view that dieselization has had the effect of augmenting the car supply because it has "substantially" improved car utilization. He has never been able to get a railroad man to estimate the value of a freight car under diesel conditions as compared with steam, but he has heard some

guesses that dieselization makes freight cars "about 16%" more available.

The colonel advocated again that the government build some 50,000 freight cars for use in the event of an emergency. His theory is that equipment for transportation for war "is as much a responsibility of the government as tanks and guns." And he warned that if railroad equipment and trucks are not built before a war begins, they will not be built.

Another recommendation of the commissioner is that there be created a secretary of transportation in the President's cabinet. He anticipates such an official would become "so valuable" he would not change with changes in Administration. He predicted, however, that "you'd chew up" the first three or four transport secretaries before benefits of the hold-over arrangement were recognized.

Labor & Wages

Non-Ops Cripple Three Roads

L&N, NC&StL hard hit; Clinchfield's supervisory forces maintaining about half of normal service

Carrying out their threat to strike against the Louisville & Nashville and its affiliates, the Nashville, Chattanooga & St. Louis and the Clinchfield (*Railway Age*, March 14, page 7), the non-operating unions ceased work and posted pickets on all three roads at 6:00 a. m. March 14. Because train service employees observed the picket lines, the walkout soon brought many L&N and NC&StL operations to a halt. A late check showed the L&N had cancelled all passenger trains but that freight services were about 50 to 75% normal; that the NC&StL, with 70 daily freight schedules cancelled, expected to operate only one passenger train in and out of Atlanta, plus some local mixed service on three branch lines; and that the Clinchfield was operating about 50% of its freight services with supervisory forces "working their nails off."

Impact of the strike is being felt in many quarters but especially in Kentucky coal mines served by the L&N, where mine operations are being halted for lack of cars. In the strike call, the unions did allow trains which had already departed from their originating terminals to complete their runs.

Shortly after the strike began, the L&N attempted to get a court order to prohibit the walkout, but Judge Stuart E. Lampe of the Jefferson circuit court, Frankfort, Ky., refused to issue a temporary injunction and his decision was later upheld by the state court of appeals. Later, however, Judge Lampe did issue an order barring the operating unions from honoring the

non-ops' picket lines in Kentucky. This temporary restraining order was short-lived, however, as the operating unions immediately filed a motion for its dissolution and Judge Lampe vacated the order on the morning of March 16. The L&N has filed an appeal.

Puzzler—John E. Tilford, president of the L&N, said his company never received official notice of the strike call and that he was dependent upon press reports. Restating his company's position (set forth in last week's *Railway Age*), Mr. Tilford disclosed that the L&N had contracted with the New York Life Insurance Company for a health and welfare insurance policy. This policy has been made available to any L&N employee desiring its protection at a cost to each employee of \$1.85 per month, compared to \$3.40 for the unions' national fund plan. Benefits are identical in both plans, Mr. Tilford reiterated. The L&N, he said, "has been actuated from the beginning . . . with the purpose of protecting the interest of its employees, thousands of whom have made known to the management their opposition to the costly and compulsory national plan. We are now confronted with the puzzling situation of a strike under orders of the national officers of the unions of the very employees we want to protect."

Charges Denied—George E. Leighty, president of the Order of Railway Telegraphers and spokesman for the striking unions, charged that the L&N's health and welfare policy would have a lower cost only temporarily and that "what the carrier professes to give on its own will be withdrawn as soon as

L&N SUES UNIONS

Just at press time for this issue, the L&N filed suit for strike damages against both the striking non-operating unions and operating groups observing the non-ops' picket lines. The suit asked \$215,000 a day from each group for the duration of the walkout. Meanwhile, the strike has spread to the Atlanta & West Point, the Georgia, and the Atlanta Joint Terminal—L&N affiliates—but word of the effectiveness of those walkouts was not obtainable at press time.

The Louisville Courier-Journal and the Kentucky Chamber of Commerce have asked President Eisenhower to recall the emergency board which decided the fringe-benefit-demand case of the non-ops last May. The paper suggested the board might review the L&N's proposals to see if they fulfill the intent of the board's recommendations in the national case. A representative of the National Mediation Board has been in contact with both sides in the present dispute but reports he is "not making much progress."

The suggestion that President Eisenhower "recall or renew" the emergency board whose findings as to health and welfare benefits are the basic issue in the strike has been accepted by President Tilford of the L&N.

Mr. Tilford's acceptance of the suggestion, for the L&N, came in a letter to the Courier-Journal written shortly after publication of the suggestion. In it, Mr. Tilford said he would "accept the challenge" to show that the L&N has "fully complied with recommendations of the President's emergency board, if that board is reconvened or a new board appointed"; and would "agree in advance" that the railroad would "abide by the findings" of a new or recreated board. He further suggested that "the railroad and the striking employees should go back to work pending the convening of the board and carrying out this commitment."

Brotherhood reaction to the Courier-Journal's proposal had not been made public at press time for this issue.

it has served its purpose . . . Once the strike threat is removed, the carrier would either immediately increase the insurance premium or even drop the insurance policy entirely . . . We are now pressing for our original proposal, namely, that the L&N, the NC&StL and the Clinchfield pay the entire cost of the insurance program—this to be made air-tight by a signed agreement." An authorized L&N spokesman said there was "absolutely no truth" to Mr. Leighty's charges and that the L&N had no intention of cancelling the policy.

The non-operating unions participating in the walkout include those rep-

representing the boilermakers and blacksmiths, the electrical workers, carmen, machinists, sheet metal workers, firemen and oilers, clerks, telegraphers,

signalmen and maintenance of way employees. The L&N said about 95% of its office clerical forces were still on the job the morning of March 17.

Traffic

RRs Need Diversified Traffic

American Railway Development Association's 46th annual meeting hears M. I. Dunn, of the C&O, stress that need for new and diversified traffic is greater than ever

"Railroads have never needed new and diversified traffic more than they do today," M. I. Dunn, vice-president, construction and maintenance, of the Chesapeake & Ohio, said in White Sulphur Springs, W. Va., March 7.

Mr. Dunn, addressing the opening business session of the 46th annual meeting of the American Railway Development Association, emphasized that one of the "imperative duties" of railroad management is to insure continuity of dividends. "Fluctuations in earnings," he continued, "can endanger dividends. If earnings come principally from one specialized class of traffic an abrupt softening in the level of business actively associated with that particular traffic can interrupt the continuity of dividends and cause such widespread dissatisfaction among our owners, the stockholders, as to disturb the continuity of management. Diversification through location of new in-

dustry and different types of industry on your lines is probably the best insurance against such an undesirable chain reaction."

As an example, Mr. Dunn pointed to the C&O's industrial development program which last year produced revenues from merchandise freight that exceeded 50% of total freight revenues, the first time in the road's history that merchandise revenue was higher than that from coal.

President's Report—ARDA President R. O. Robertson, general real estate agent of the C&O, pointed out in his report that 1955 marks the 49th year of the association's life and that plans are being made to celebrate the group's golden anniversary in 1956. "While the first meeting of our organization [then known as the American Railway Industrial Association] was held in Chicago October 17, 1906," he said, "there were no regular meetings

in 1907, during the war years 1918-1919 and 1945, nor, for economy reasons, in 1933."

Section Meetings—Three sections of the association met simultaneously on the afternoon of March 7: The agricultural, forestry and land settlement section (chairman—L. P. East, general agricultural agent, Pennsylvania); the industrial section (chairman—F. B. Stratton, director of industrial development, Western Pacific); and the real estate section (chairman—J. W. Ewalt, general real estate agent, PRR).

Three steps railroads might take to improve their programs of helping industries to find plant sites were outlined at the industrial section meeting by R. H. Powell, manager, property management department, Ford Motor Company. First, he said, railroads should enlarge their industrial departments and "dignify them by giving them more authority." Such departments "should have ample personnel" and should hire people trained for the work because "the stakes justify it."

Secondly, Mr. Powell continued, railroads should never wait until they are called on by industry to assemble all pertinent information about land on their lines or in their territories. Such data should be immediately available when requested by a potential customer. Finally, development of land along railroad rights-of-way, he said, should be controlled by the carriers through having it zoned for industrial use, or by outright purchase.

A. T. Waidelich, vice-president and manager of the research division of the Austin Company, told the industrial section that rates are not the sole factor determining what carrier an industry chooses. "There are lots of other considerations," he emphasized, "such as responsibility, reliability and on-time performance. Costs are important, but all of us know the cheapest service is not necessarily the most economical."

Next Meeting—Next meeting of the association will be in the Peabody Hotel, Memphis, Tenn. The date is to be announced later.

British Railways Plan "Automobile Piggyback"

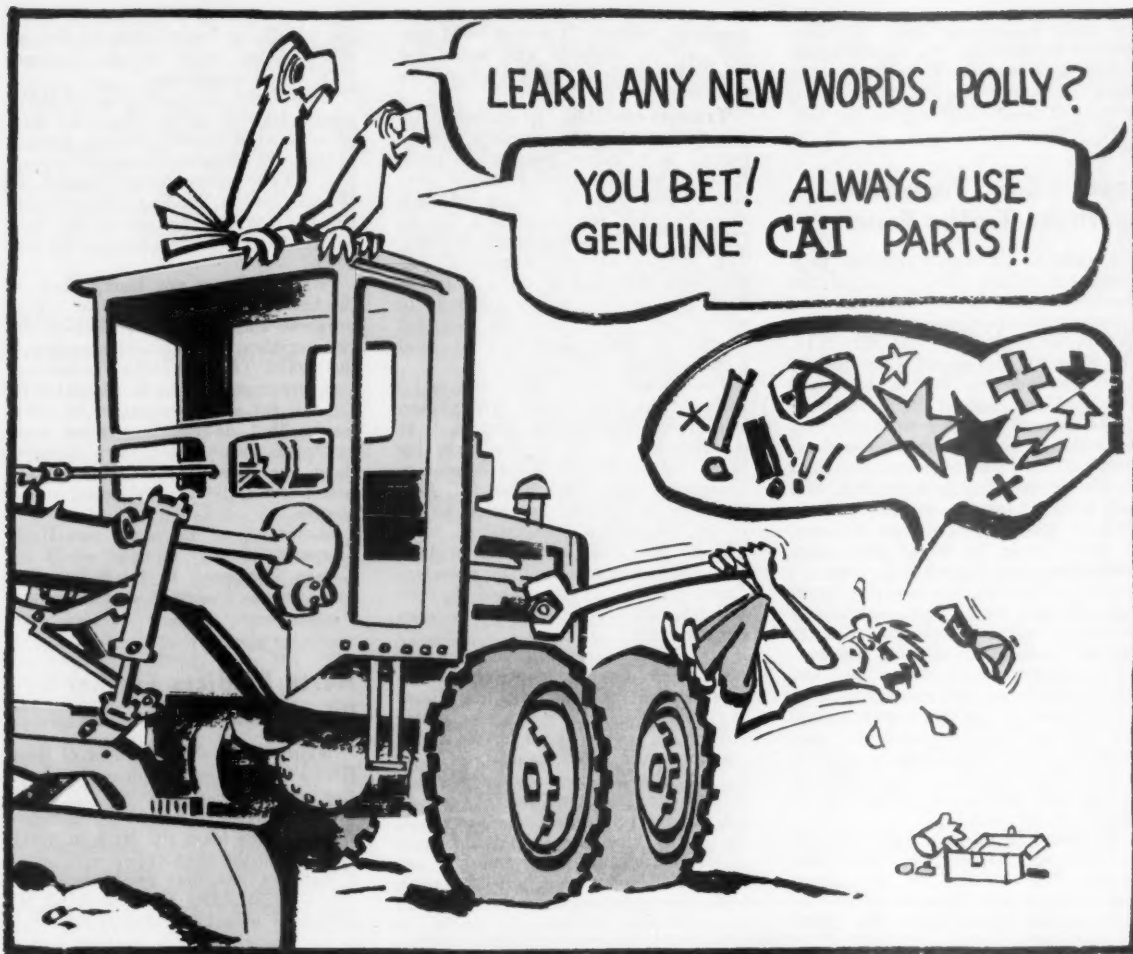
A piggyback operation serving passengers rather than freight will be introduced by British Railways this summer between London and Perth, Scotland. The service will be handled in special trains, composed of flat cars for automobiles and sleeping cars for motorists. These trains are expected to make the 450-mile London-Perth run in 10 hr, overnight, compared with average driving time of two days. That time factor, plus adverse road conditions, has reduced the number of motorists touring the Scottish Highlands, according to British Railways.

The Railway Gazette (London) says the fare for the new service will be £15 (approximately \$42) round trip, for car and driver; £4, 10 sh. (\$12.60)



ARDA'S NEW OFFICERS are congratulated by retiring president R. O. Robertson (second from left), general real estate agent, Chesapeake & Ohio. Left to right are the association's new first vice-president, D. M. Lynn, assistant vice-president, industrial development, Erie; Mr. Robertson; Pres-

ident P. R. Farlow, general agricultural and forestry agent, Illinois Central; Second Vice-President E. E. Exon, real estate and tax agent, New York Central; and Secretary-Treasurer F. E. Wolff, general agricultural agent, Eastern region, of the Canadian Pacific.



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the top to form the hard-service top ring groove. And that top ring—if it's genuine Caterpillar—is heavily chrome-faced. Each Cat ring is individually cast from specially alloyed iron. With substitute parts: who can be sure?

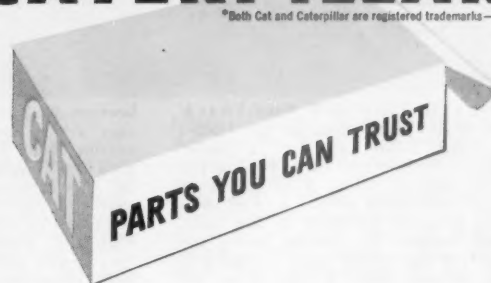
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*Both Cat and Caterpillar are registered trademarks—®



for extra passengers; and £3, 5sh. (\$9.10) for children. The special trains will include cars fitted with tables, at which passengers can eat picnic meals, or packed meals supplied by the railroads.

Special Cars, Piggyback, Spotlight Traffic Forum

A railroad president and two vice-presidents talked about three of the "hottest" topics in the business at a record-attendance meeting of the Motor City Traffic Club in Detroit, March 14. The program also featured a panel of four top industrial traffic managers who fired questions at the railroaders.

The idea of specially equipped cars for steel received the enthusiastic approval of David E. Smucker, president of the Detroit, Toledo & Ironton, who said such equipment would provide a kind of permanent dunnage, the cost of which could be spread over many profitable uses. Contending that the special equipment provided for movement of auto parts had "retained a volume of traffic so highly susceptible to damage as to make railroad transportation almost prohibitive under any other conditions," the speaker said no special favor is conferred upon a shipper by supplying him equipment particularly suited to his loading requirements, "so long as he has sufficient volume and continuity to permit recovery of the cost."

Norman J. Brennan, director of traffic, Chrysler Corporation, asked Mr. Smucker to comment on the charge that automobile manufacturers are unduly favored by railroads. The DT&I

president replied: "I would build special cars for anybody who would use them as effectively as the automotive industry."

Trailers-on-flats, "an ancient method of transportation recently rejuvenated," is a "secret weapon" for railroads to use in cutting terminal costs and delays, and in serving off-track shippers and receivers, said L. E. Claraham, vice-president of the Wabash. The speaker called "piggyback" experiments the kind of thing railroads must do, "if they are to continue to serve," and to reverse the constant decline in their proportion of total traffic moving.

The Wabash itself, Mr. Claraham reported, "has not reached within even measurable distance the final goal, as to extension of the service, both between points on the Wabash, and in connection with other railroads." That road has just placed an order, he revealed, for several 32-ft trailers. Some will be insulated, some will include side doors, and some will be open-top. These trailers, to be owned by the Wabash, will be in addition to units already leased.

The Wabash favors movement of railroad-owned trailers containing rail-billed freight because, said Mr. Claraham: "(1) We feel we can give better service . . . by having all phases of the operation under our control, (2) we do not like to have anyone between us and our customers, and (3) we do not like the rate aspect of other plans. We do not feel we should charge a customer 75 cents a car-mile, for example . . . and then handle the same traffic for our competitor for 20 cents a trailer-mile. If we can afford to

move traffic at lower rates, we feel we would rather do it for the customer than for a competitor."

Would the railroad offer T-O-F-C service for the trailers of private shippers, asked William S. Nevius, director of traffic, Wyandotte Chemical Corporation. "We're open-minded" replied the Wabash officer, adding "No shipper has tried to get this service yet from our road. He wouldn't have to try very hard."

"Railroads are not losing sight of the human being" in their fast rate of progress, emphasized S. J. Massey, Jr., vice-president and general manager of the Grand Trunk Western. Indoctrination programs, he said, generally fill the bill for good production on lower levels, "but do not help those same employees years later when some of them are called upon to develop a brand-new skill—that of being an executive."

Moderator of the panel was H. E. Chapman, traffic director of S. S. Kresge Company. L. C. Williams of the Erie was chairman of the committee in charge.

Hertz Predicts Further Rent-a-Car Expansion

Walter L. Jacobs, president of Hertz Rent-a-Car System, Chicago, prophesies that railroad travelers, in a few years "will see a rented car awaiting them as they leave the train in nearly any city in the country."

Pointing out that establishment of rent-a-car facilities right at major terminals is a fast growing trend which is increasing service to railroad passengers, Mr. Jacobs went on to say that, in the past year and a half, Hertz has begun operating at more than 20 major railroad terminals, where cars are garaged all day and Hertz attendants are on duty. In addition, the system maintains many "call a car" services at smaller stations, whereby the incoming traveler uses a special telephone in the station to connect him with the local Hertz service, which can deliver a car to him in a few minutes.

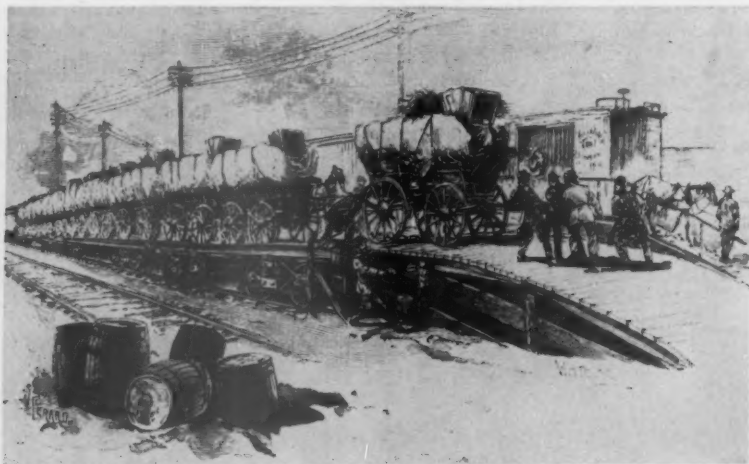
Commenting on the merit of the rail-auto plan, Mr. Jacobs stated that, in 1947, when Hertz began national advertising of the plan, about 2,000 cars were in service in about 200 cities—today the Hertz fleet totals more than 12,900 cars in more than 600 cities.

Third Quarter Estimates Of Loadings 7.2% High

The Regional Shippers Advisory Boards overestimated car loadings of 1954's third quarter by 7.2%.

This was shown by the latest comparison of forecasts with actual loadings, issued by Chairman A. H. Gass of the Car Service Division, Association of American Railroads.

The comparison showed that 12 of the 13 boards submitted overestimates,



WHOEVER THOUGHT PIGGYBACK WAS NEW? Way back in the 1880's the Long Island ran a "Farmers' Train" which often carried as many as 75 wagons—the horses riding in special cars—with drivers and farmers riding a coach attached to the train. Farm wagons are shown being unloaded at the road's Long Island City ferry station after a trip from Al-

bertson in Nassau County. The horse cars are in the background. Precise reason for discontinuance of this piggyback prototype are not known, but it is believed that construction and surfacing of many Queens County roads led to diversion of the traffic to highways. That kind of competition, too, began earlier than many would have suspected.

which ranged from 0.9% for the Pacific Coast board to 18.1% for the Pacific Northwest board. The underestimator was the Southwest board, its forecast having been low by 0.6%.

On a commodity basis, there were overestimates for 23 groups. They ranged from 0.9% for "other fresh vegetables" to 20.9% for iron and steel. Underestimates for the other nine groups ranged from 0.5% for salt to 9.6% for cotton.

Shippers and RRs Told To Concentrate Traffic

Concentration of traffic on railroads, by various means, to lower costs and rates, was urged by at least three men appearing before the New England Shippers Advisory Board in Hartford, Conn., March 10.

A special feature of the meeting of the board's Loss and Damage Prevention Committee, the previous day, was a demonstration of the plexiglass box car constructed by the Canadian National to show what goes on inside a car at various impact speeds (*Railway Age*, April 26, 1954, page 10). The plexiglass car is on loan to the New Haven for demonstrations before employees.

Concentration—J. B. Griffin, superintendent traffic, Scovill Manufacturing Company, Waterbury, Conn., a chief proponent of the so-called Griffin Plan, for concentrating lcl shipments on best service routes (*Railway Age*, October 6, 1952, page 95), reported on behalf of the board's Less-Carload Committee that "there is no doubt railroads do want lcl business. It is apparent that the missionary phase of our work is over."

Mr. Griffin expressed the opinion that "channelized route plans," or "voluntary route restrictions," are working out well in New England for railroads, for shippers and—most important—for shippers' customers. He said much of the unsatisfactory service and high cost in moving small shipments "results from our dilution of the traffic. We must return to mass transportation."

Norris W. Ford, executive vice-president, Manufacturers Association of Connecticut, expressed the belief that realistic rate-making and a reasonable concentration of traffic would greatly improve the railroads' position. He complained of the tendency of truck rates to be tied to the railroad rate structure, which defeats the intent of Congress in preserving inherent advantages of each form of transportation. "I think you would be alarmed if you knew how many inquiries we are getting at the association about the cost of operating private fleets of motor trucks."

Arthur H. Gass, chairman, Car Service Division, AAR, speaking on "What Transportation Means to New England," said the country never needed mass transportation so much as it does now. While some elements of government may not appear to recognize this

importance, the federal government, as a whole, apparently does—a fact demonstrated by the large sums which the U. S. is spending in building and improving railroad transportation in aid programs for foreign countries.

What's in Freedom?—In a talk entitled "Freedom—What's In It for Shippers?," William H. Schmidt, Jr., executive editor of *Railway Age*, contended that regulated common carriers are rapidly losing ground to private, contract and exempt transportation. "They are neither free to compete—as are shippers in their respective businesses—nor are they protected in the slightest degree from competition—as are electric power or telephone companies."

"These are two opposing worlds in freight transportation in this country. We cannot much longer maintain 'co-existence.'"

"Nobody today can keep transportation from being bitterly competitive. The only thing that regulators can do is to keep transportation companies from competing—and staying alive."

The speaker drew a parallel to the situation of electric companies, which have faced and met the competition of private generation of power. Today fewer companies make electricity for their own use than ever before.

"If you look at rates of utility companies you will find that they do everything possible to encourage you to use their facilities in ever-increasing amounts, and to discourage you from making your own power. "Does the present railroad rate structure—and the

regulation under which it exists—have this effect? Does present regulatory practice allow the common carriers to encourage greater volume, hence lower costs, and to discourage private transportation? The answer to both questions must be 'no.'"

Operations

Transportation if H-Bomb Drops

"The job of civil defense as it relates to transportation cannot possibly be done entirely by civil defense agencies as now constituted and financed, but is a responsibility, by and large, of the transportation industry itself," Arthur C. Jenkins, consulting engineer and former chief of the Division of Transportation of the California Office of Civil Defense, said in addressing a recent meeting of the Pacific Railway Club at Los Angeles.

"The catastrophic character of disaster . . . as a result of H-bomb potentiality," he declared, "throws too much of a burden upon those few who are charged with the responsibility, but stripped of the means, of promulgating procedure and creating plans. . . ."

"The ultimate objective of civil defense and the military forces is essen-

(Continued on page 70)



STATION APPROACH LIGHTING—old style and new—show up in striking contrast in this picture of the approach to Pittsburgh's Pennsylvania Station when its new lighting was half completed. On the left, incandescent lighting from post top luminaires concentrates its effect along the pedestrian walkway, leaving the roadway

relatively dark. In the new installation on the right, Westinghouse luminaires on pendant poles utilize 400-watt fluorescent-mercury lamps to provide high levels of illumination over roadway and walkway alike. The lighting is a part of an extensive modernization program being conducted at the station by the Pennsylvania.

EXECUTIVE OFFICE MEMORANDUM

To: JKR

Recheck our car upgrading program for this year and let us know what improvements are intended that will meet the suggestions in the attached resolution.

Take a good look at National's "Impact Report" covering impact tests. Their Rubber-Cushioned Draft Gears seem to hold the answer to this resolution. National's report shows coupler force reduction of 33%; center sill stress reduced 50% at high impact speeds.

Better give serious consideration to this draft gear betterment on all cars being upgraded and on all new cars.

RMT

Memorandum, please change all car upgrading and new car specifications to read "National MF-275 Rubber-Cushioned Draft Gears".

Lower coupler force and lower center sill stress will lower our maintenance costs on car repairs in addition to greater loading protection.

MEMORANDUM

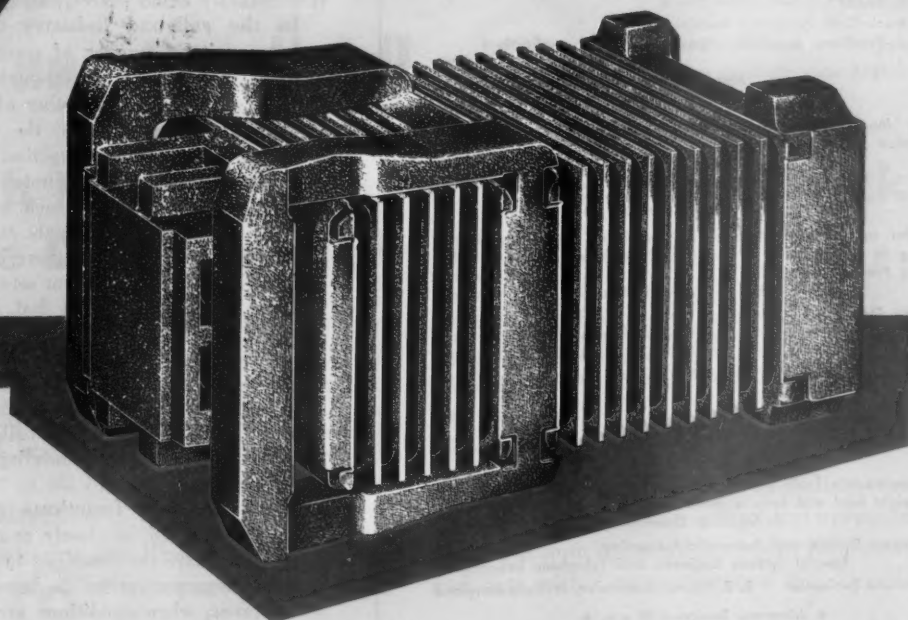
Executive Office

***RESOLUTION NO. 2**

BE IT RESOLVED that railroads in all Board territories are requested to make greater use of shock absorbing draft gear and other equipment designed to reduce the effect of excessive car impacts.

* National Management Committee Report,
National Association of Shippers
Advisory Boards,
Proceedings—Eighteenth Annual Meeting
October 14, 1954
Louisville, Kentucky

NATIONAL MF-275 RUBBER-CUSHIONED DRAFT GEAR



NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

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AA-1000

RSPA PROGRAM

Applied Electronics

APPLICATION of electronic computers and communications devices in the railroad industry will be the subject of the annual Spring meeting of the Railway Systems and Procedures Association. The meeting will be held at the Morrison Hotel, Chicago, April 12-14. The program:

TUESDAY, April 12

9:00 a.m.—Registration Ballroom foyer
 • Morning Session—10:00 a.m. •
 President's Annual Report W. N. Norris
 General Auditor, Great Northern
 Chesapeake & Ohio assesses potential value of a high speed digital computer which will supply management at top and departmental levels with timely information
 Chairman, J. E. Kusik, Vice-President—Finance
 Defining Potential Applications J. F. Feagler
 Chief Methods Research Officer
 Designing a Communications System E. L. Morrison, Jr.
 Superintendent Freight Transportation
 Making the Economic Study A. F. Dell Isola
 Research Assistant—Vice President—Finance
 • Afternoon Session—1:30 p.m.—(C&O presentation continued) •
 Staffing and Training H. N. Laden
 Chief, Computer Systems Development
 Strengthening Management Control William Bamert
 Assistant to Vice-President—Finance
 The Univac File Computer—Potential railroad applications of an intermediate-sized alpha-numeric electronic computer.
 J. Crabtree, Director, Product Applications, Remington Rand, Inc.

WEDNESDAY, April 13

• Morning Session—9:30 a.m. •
 Computers Control UP Yard Operations
 Perry A. Seay, Vice-President, Reeves Instrument Corporation;
 I. A. Cornell, Assistant to Vice-President, Reeves Instrument Corporation; R. J. Berti, Assistant Electrical Engineer, Union Pacific; T. W. Hays, General Signal Engineer, Union Pacific; D. C. Bettison, Signal Engineer, Union Pacific
 New Electronic Data Processing Machines
 Cardatype—Functions, capabilities, possible railroad applications
 A. A. Santry
 Manager, Special Cardatype Department
 International Business Machines Corporation
 Inventory Management—Application of the type 705 computer to multi-location inventory management J. F. Williams
 Senior Sales Representative
 International Business Machines Corporation
 • Afternoon Session—1:30 p.m. •
 A computer, and related equipment, involved in the weighing and data processing in connection with the Great Northern's iron ore traffic Operating Practices P. A. Nemcek
 Staff Assistant to General Manager, Great Northern
 Accounting Operations P. G. Pagel
 Auditor Mechanized Accounts, Great Northern
 The Computer Curtis Fritze, Project Engineer
 Engineering Research Associates Division, Remington Rand, Inc.

THURSDAY, April 14

• Morning Session—9:30 a.m. •
 The Pennsylvania's Train Performance Calculator—How much tonnage can a freight haul and keep a given schedule? S. V. Smith
 Assistant Electrical Engineer, Pennsylvania
 Long Distance Dialing and Automatic Accounting T. L. Dimond
 Special Systems Engineer, Bell Telephone Laboratories
 Electronics—An Evaluation B. E. Wynne, Controller, Western Maryland
 • Afternoon Session—1:30 p.m. •
 Business Meeting—members only.

Benchmarks and Yardsticks

THERE ARE A NUMBER of big companies which are operated effectively by a two-man executive set-up, instead of one man only. One of the most successful of such companies is Standard Oil of Indiana—and the March 5 issue of *Business Week* magazine describes how the duties are divided between the two executives.

The chairman of the company is Dr. Robert E. Wilson and the president is Alonzo W. Peake. While Dr. Wilson is, technically, the top man—actually there is a pretty clear-cut division in responsibilities. Finance, research, law, the corporate secretary's operations, and public relations come directly under Dr. Wilson—while President Peake handles the other executive functions: refining, production, transportation, sales.

Either executive is entitled to get information directly (i.e., without going through the other) from any department of the company—and, in the absence of one of the executives, the one on the job may make decisions, even for the departments for which the other has primary responsibility.

As the division of functions is described, it would appear that Dr. Wilson is primarily the company's spokesman in its outside relations (in the broadest sense of the term), while President Peake concentrates on internal operations. For such a set-up to function effectively, it is quite evident that the personalities of the two executives must be an important ingredient. Without their will, and ability, to work as a team, such a division of top responsibility could scarcely be expected to work.

In the railroad industry there have been, and are quite a number of companies with both presidents and chairmen—although usually (but not always) either one or the other of them is unquestionably "the boss." Often, the chairman of the board performs only the function that his title indicates—although there are noteworthy exceptions.

For a big company, such an arrangement—where two capable individuals can be found who can function in harmony—there is a great deal to be said in favor of the team set-up. The strongest argument for it is the fact that, in a large enterprise no one man has the time available to make all the public contacts that the head of a big company needs to make—while still having enough time left in which to do an effective job of internal management. With excessive calls on the time of one man, too many jobs needing top-flight attention may not get it.

The executive functions are usually done best when tailored, as closely as may be, to fit the people who have the functions to perform. But the team arrangement seems to have a lot of things in its favor, when conditions are favorable to its application. J.G.L.

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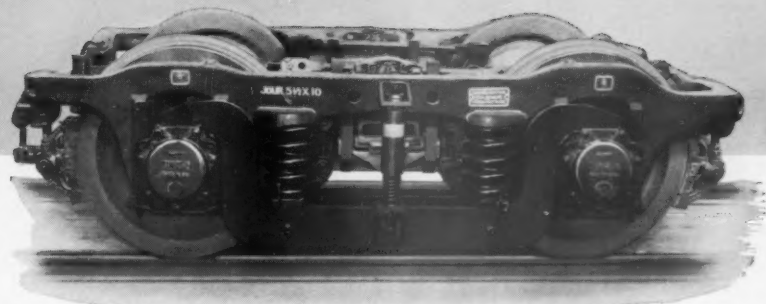
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For outstanding protection to lading, cars and track, and for most economical operation with minimum upkeep costs equip your head-end cars with COMMONWEALTH BX Trucks.



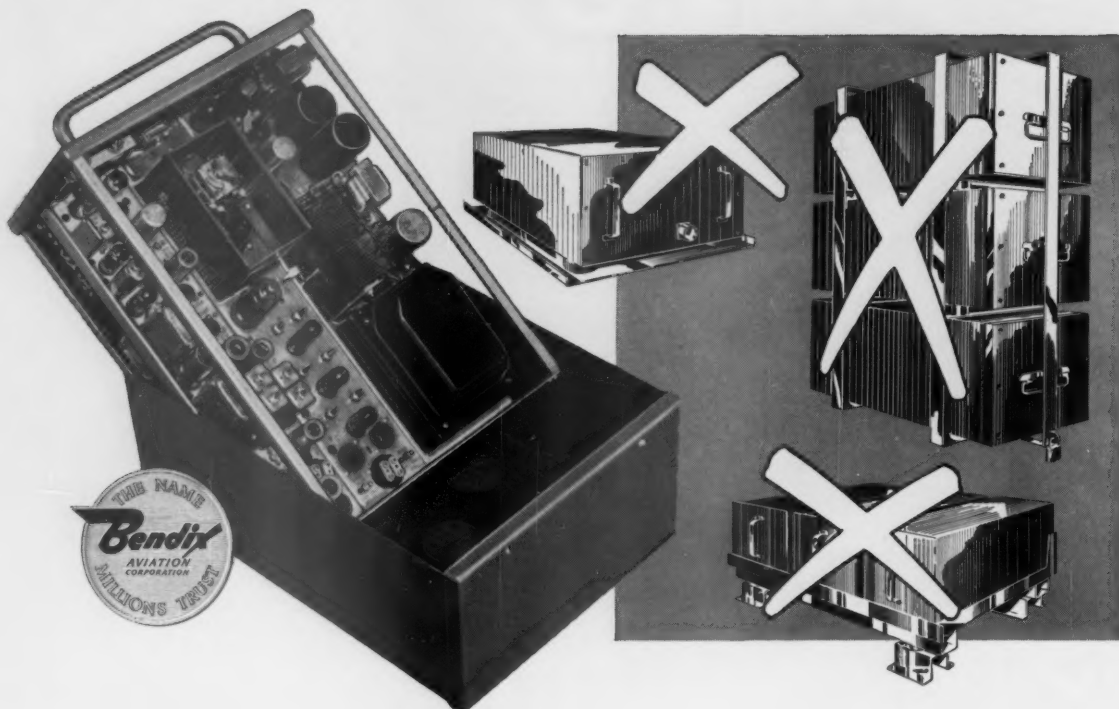
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The proven quality and reliability of G-E motors, generators, and controls assures the continued outstanding economy and performance of Baldwin locomotives in all types of service.



Road Freight RF-16



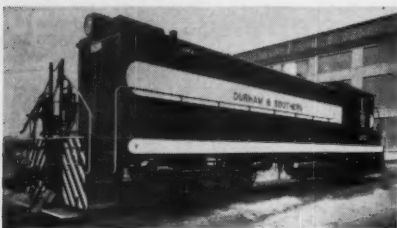
All Service AS-16



Switcher S-12



All Service AS-416



Road Switcher RS-12



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The Equipco Non-Spin Hand Brake is easily operated with one hand...allowing the brakeman to keep a safe hold on the grab iron at all times. The brake wheel is the only control. To set the brake, the wheel is turned clockwise; and

for gradual release, the wheel is turned counter-clockwise the desired amount. The wheel can be left in any position *and it will remain there until it is moved again.*

For speed and safety, specify Equipco Non-Spin Hand Brakes. Available also are the drop-type hand brake for flat cars and the lever-type hand brake for drop-end gondolas. Every brake is A.A.R. Certified. Write today for free booklet, "Hand Brake Safety."

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Here's a revolutionary *advance* in rolling stock maintenance . . . assuring longer, more useful life for locomotives and cars. The new Whiting Wheel Grinder provides an accurate short-cut to restoring proper wheel contour . . . *without removing the wheels* . . . turns shop-time into road-time!

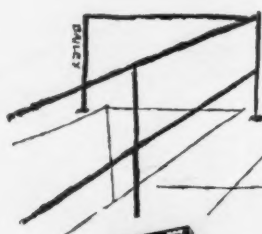
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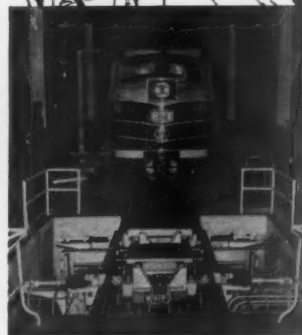
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In the Baltimore and Ohio Railroad Cumberland Diesel Shop, the Whiting Wheel Grinder turns out eight pairs of corrected wheels per day. As the operators acquire more experience, this rate is expected to materially increase. The whole operation is done without opening a single bearing box or loosening any bolts or nuts. Photo shows Baltimore and Ohio locomotive being driven right onto the grinder.

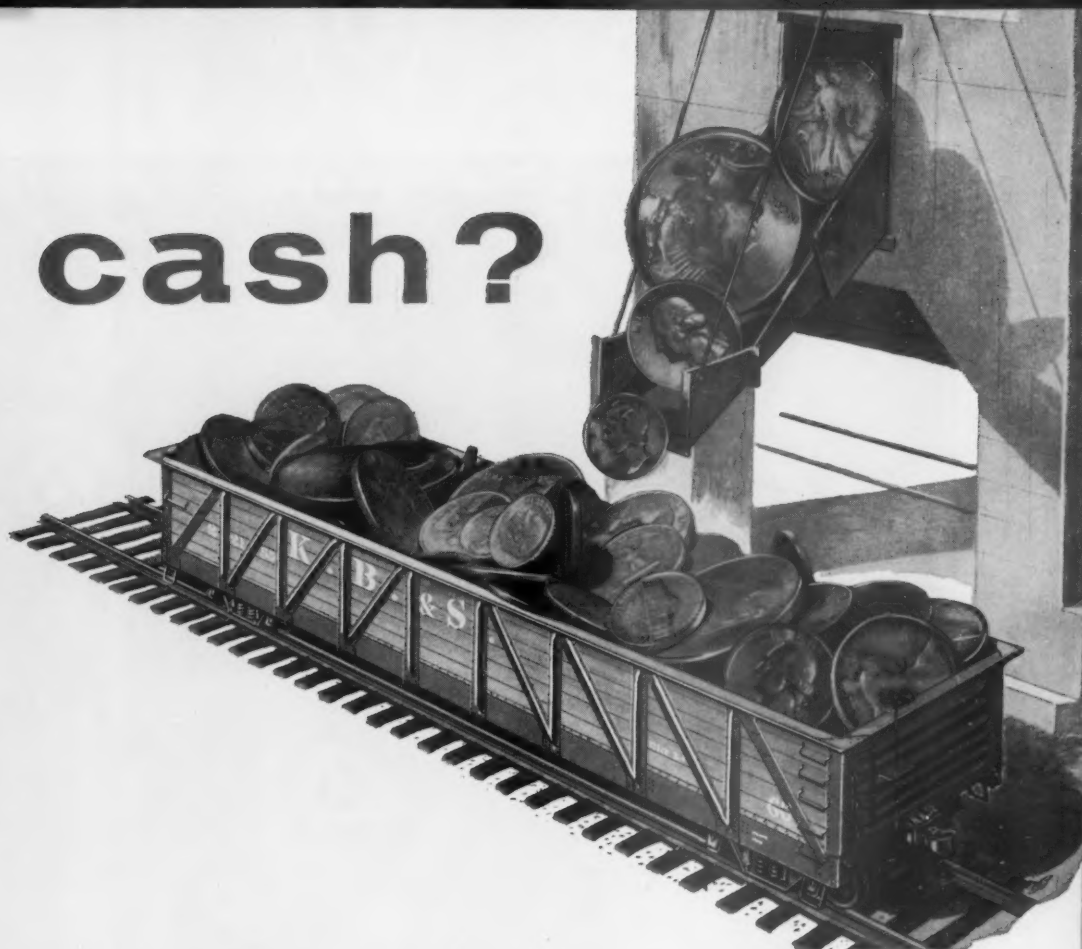


Other Whiting-built Cost Savers for Railroad Maintenance
Include: Cranes, Drop Tables, Jacks, Train Washers.

**Are your freight cars
collecting cobwebs . .**



. or cash?



You can eliminate out-of-service time, due to decay damage, by constructing or repairing cars with Koppers Pressure-Treated Car Lumber

Railroad records show that a car with *untreated* wood members usually lasts for only five years . . . before it's sidetracked for costly repairs to the lumber. And it may be months before a damaged car is earning revenue again; for railroads tell us it's necessary to wait until enough bad-order cars have accumulated to make it worthwhile to open the carshop or a repair track.

Service Life Tripled!

So it's not surprising that so many railroads have switched to Koppers Pressure-Treated Car Lumber. This lumber gives good service, on the average, for seventeen years. It outlasts *untreated* lumber better than three-to-one.

Revenue Increased!

Construction or repair of decking, sills, lining and other car members with Koppers Pressure-Treated Lumber assures those extra years of in-service revenue. And don't forget: this *protected* wood makes possible huge savings in maintenance—not to mention the out-of-pocket costs for switching cars to and from shops.

FREE ANALYSIS

OF YOUR LUMBER PROBLEMS!

Let us analyze your lumber problems and then discuss with you the savings that can be effected by using Koppers Pressure-Treated Car Lumber.

KOPPERS COMPANY, INC.

Wood Preserving Division, Pittsburgh 19, Pennsylvania



PRESSURE-TREATED CAR LUMBER

Capacity that Counts When You Need It!

RAILROAD
and
CAR MATERIAL

STRINGERS, CAPS
and SILLS
in DENSE
SHORTLEAF PINE

SWITCH TIES in
OAK and GUM

OAK FREIGHT CARSTOCK
and TIMBERS

HERCULIFT PALLETS



INQUIRY INVITED

CROSSETT LUMBER COMPANY

A Division of The Crossett Company
CROSSETT, ARKANSAS



WHAT HAPPENS NEXT?

If management has been wise, a fire tragedy will be stopped before it starts...if not, in 20 minutes extensive destruction and total loss could readily be the result.

First-rate fire protection is essential to the continued success of any business. With C-O-TWO Smoke or Heat Fire Detecting Systems, plus C-O-TWO High Pressure or Low Pressure Carbon Dioxide Type Fire Extinguishing Systems, as well as PYRENE Air Foam Type Fire Extinguishing Systems for specific outdoor locations, your plant can have fast, positive round-the-clock fire watchman service simultaneously at each fire hazard point... a fire tragedy is stopped before it starts.

Furthermore, there is a personal sense of responsibility inherent with PYRENE—C-O-TWO Fire Protection Engineers that assures you of fully adequate firesafety... a definite plus in your behalf. Whether it's fire detecting or fire extinguishing... portables or built-in systems... PYRENE—C-O-TWO means top quality backed by experienced engineering that results in operating superiority for you at all times.

Act now... don't take unnecessary chances with your investment any longer... the extensive experience of PYRENE—C-O-TWO over the years is at your disposal without obligation. Remember... a plant-wide fire protection survey skillfully executed today could be the means for greater profits tomorrow.



PYRENE — C-O-TWO

NEWARK 1 • NEW JERSEY

Sales and Service in the Principal Cities of United States and Canada

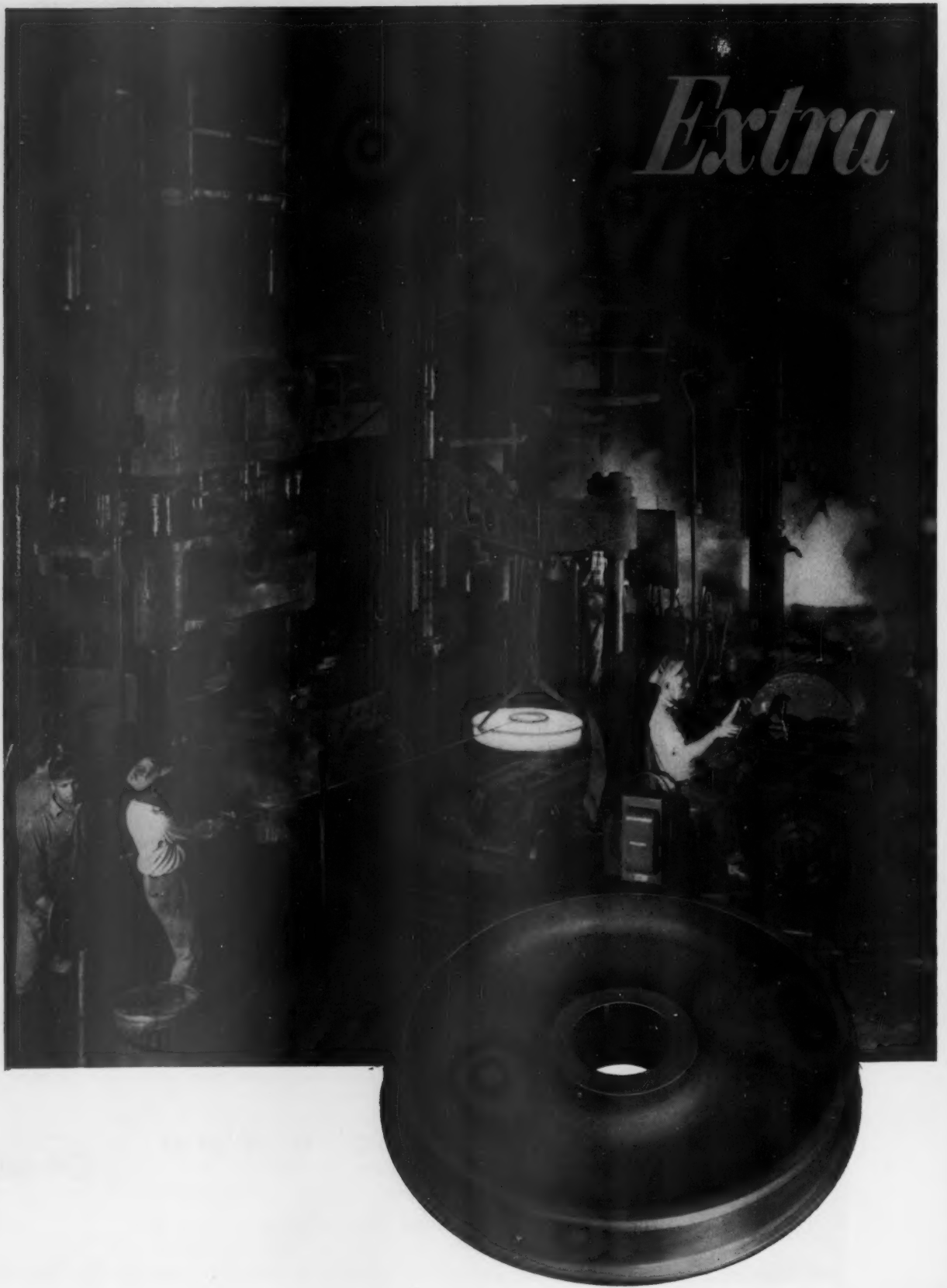


COMPLETE FIRE PROTECTION

portable fire extinguishers... built-in fire detecting and fire extinguishing systems

CARBON DIOXIDE • DRY CHEMICAL • VAPORIZING LIQUID • SODA-ACID • WATER • CHEMICAL FOAM • AIR FOAM

Extra



mileage made here

This is a picture of men making USS Wrought Steel Wheels. Only a few of the forging operations are shown here, but all are indispensable to producing Wrought Steel Wheels of superior strength, excellent soundness, and long wearability.

In the extreme background of the picture, a hot wheel blank is being served up to a press for its second forging.

At the left of the picture, a wheel that has just come off the second forging is being swung from a cart into the mammoth punch press that will knock out the center of the wheel hub.

After the punch operation, the charging machine in the foreground will scoop up the wheel, whirl around and thrust it into one of the furnaces at the extreme right. In the photograph, the charging machine is just removing a glowing wheel from the furnace. Heated to the required temperature, it is ready for the rolling mill where it will be rolled to size, measured, and passed on to the coning press—and so on, and so on.

But what does this one-at-a-time wheel making do for you? What advantages will you realize from USS Wrought Steel Wheels? Well . . .

THEY LAST LONGER . . . USS One-Wear Wrought Steel Wheels will average 200,000 to 300,000 miles or more in normal freight car service.

THEY COST LESS . . . Their far greater life in any given service will reflect a substantially lower annual cost than that of the ordinary wheel, even though, initially, the One-Wear Wrought Steel Wheel costs a little more than the ordinary type wheel.

REQUIRE LESS MAINTENANCE . . . Rolling on One-Wear Wrought Steel Wheels, a car spends more time in service and less time on repair sidings, resulting in increased revenue to the railroad. Also, less frequent repair means reduced maintenance and lower labor costs.

SAVE UNSPRUNG WEIGHT . . . Because they are lighter than ordinary wheels, eight Wrought Steel Wheels under a 50-ton capacity car will save approximately 1,520 lbs. of unsprung weight, which can be directly converted into payload capacity—or result in savings due to the decreased load. Furthermore, reduced unsprung weight means less pounding on the track system.

Two strategically located complete wheel shops are ready to fill your orders for Wrought Steel Wheels: McKees Rocks (Pittsburgh), Pennsylvania shop, serving the East and Southeast, and the Gary, Indiana shop, supplying the Western and Southern Lines.

USS WROUGHT STEEL WHEELS

UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.



COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL



Four wheel truck side frame castings for this flat car were produced by The Buckeye Steel Castings Company, Columbus, Ohio. Span Bolster Castings and the Truck Bolsters (transverse bolsters) were made of a cast nickel-manganese steel to meet A.A.R. Specification M-201, Grade C, calling for minimum mechanical properties as follows:

Tensile Strength, p.s.i.	90,000
Yield Strength, p.s.i.	60,000
Elongation in 2" %	22
Reduction of Area %	45

Nickel Plate goes Nickel

Adds strength and cuts weight with nickel steel underframe and truck castings

Capacity of the flat car illustrated was increased from 493,000 lbs. to 500,000 lbs. by casting the underframe in a 2½% nickel steel . . .

. . . permitting 7,000 lbs. more in pay load than would have been available with carbon steel!

The addition of nickel increases the strength of the cast steel thus saving weight.

The one piece cast steel underframe for this car was produced by General Steel Castings Corp., Granite City, Ill., to meet the following minimum properties:

Tensile Strength, p.s.i.	75,000
Yield Strength, p.s.i.	48,000
Elongation in 2" %	25
Reduction of Area %	50

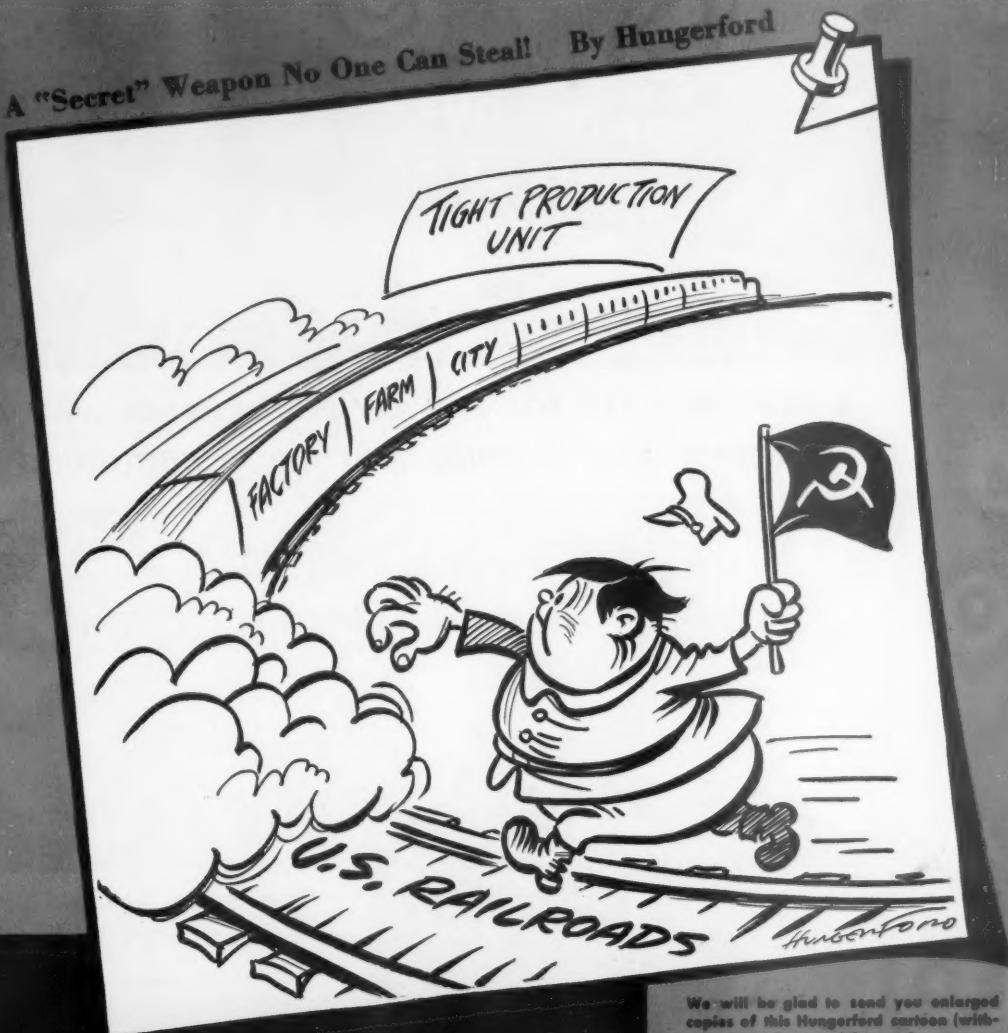
The use of nickel in these castings results in exceptional toughness at both normal and subzero temperatures . . . together with high fatigue strength and excellent ductility. If damaged, this nickel steel is easily repaired by welding.

You will find many suggestions on ways to increase the life and earning capacities of your cars in our comprehensive booklet "Nickel Alloys in Railroad Equipment." Write for your copy and any other information you need.



THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street
New York 5, N.Y.

A "Secret" Weapon No One Can Steal! By Hungerford



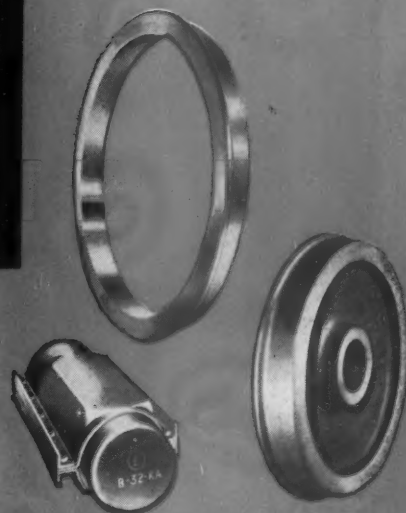
E Edgewater Steel Company

PITTSBURGH, PA.

We will be glad to send you enlarged copies of this Hungerford cartoon (without advertising copy) for posting on your office and shop bulletin boards, or a cut for your company magazine, at cost.

Serving America's Railroads

with **ROLLED STEEL TIRES
ROLLED STEEL WHEELS
AND DRAFT GEARS**



OUT OF CONTINUOUS EXIDE RESEARCH
AND MANY YEARS OF FIELD TESTING



the NEW EH Exide®-Ironclad®

A NEW STANDARD FOR RAILWAY PERFORMANCE...AN ALL NEW
ENGINEERED CAR LIGHTING AND AIR CONDITIONING BATTERY

FULL RATED POWER INITIALLY
FULL RATED POWER FOR A LONGER WORKING LIFE



Compare all railroad batteries . . . recognize why the EH Exide-Ironclad is a new standard for railroad car lighting and air conditioning.

Our standards are higher . . . the new EH Exide-Ironclad delivers 100% capacity initially—not 85%. Uniform quality assures sustained high capacity during longer useful life.

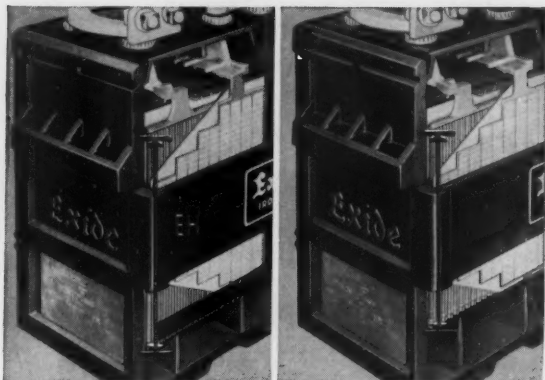
You get a new kind of a high capacity battery when you buy the EH Exide-Ironclad *plus* these Exide-Ironclad exclusive features:

- New alloys
- New plastics
- Slotted tube construction of the Ironclad Positive plate, permanently sealed on the bottom with polyethylene tube sealer. More active material is exposed to the electrolyte, resulting in greater power. More active material is retained, providing higher battery capacity for a longer working life.

New engineering designs toward simplification and new modern manufacturing facilities assure high, uniform quality.

Write for specifications of this new standard for railway battery performance.

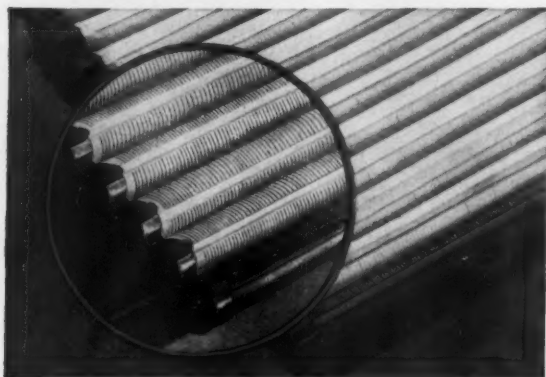
Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.



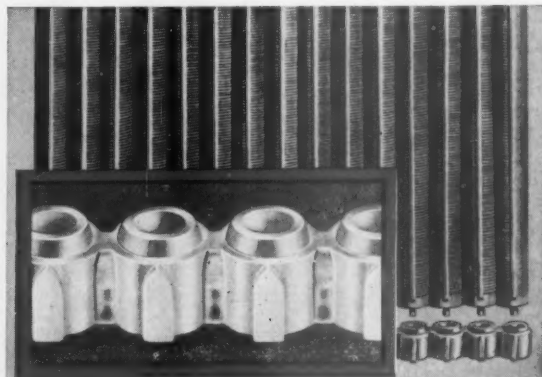
10% LONGER PLATES—10% more active material in the same space for a new kind of high capacity battery performance . . . new positive plates balanced with new stable voltage negative plates for full rated power initially . . . full rated power sustained for a longer working life.



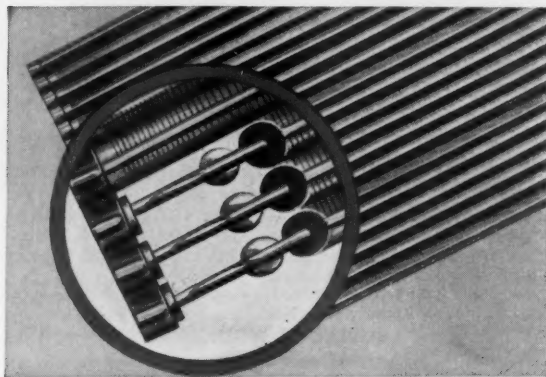
QUALITY CONTROL — continuous research . . . simplification of the design . . . new manufacturing techniques in casting and blending . . . more certain controls of production . . . result in high, uniform quality.



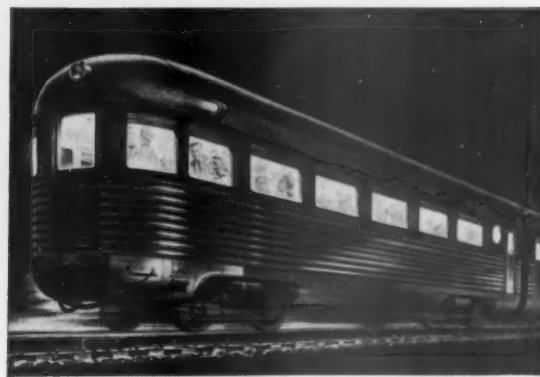
POLYETHYLENE SLOTTED TUBES—the non-oxidizing plastic tubes which retain active material in contact with the grid spine, yet permit the electrolyte to penetrate throughout the active material.



POLYETHYLENE TUBE SEALERS — this acid-proof plastic sealer fits snugly into the bottom of positive plate tubes, sealing in the active material . . . prevents shorts . . . increases useful working life of battery.



SILVIUM®—the latest development in grid alloy prevents wear of the positive grid spines of the Exide-Ironclad Positive plate . . . assures high sustained power and longer life.



ADD THEM ALL UP! You get . . . Bright Lights . . . Comfortable Cars . . . Worry-Free Performance . . . Lowest Overall Costs . . . The Best Battery Power Buy—At Any Price!

YOUR PASSENGERS DESERVE THE BEST
specify the **NEW EH EXIDE-IRONCLAD**
THE BEST POWER BUY—AT ANY PRICE

ROAD WASHES CARS STREAK - FREE

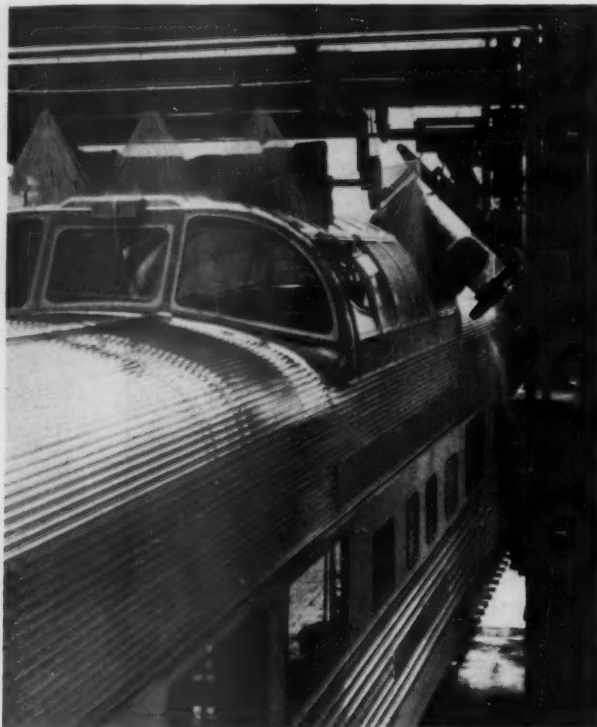
WITH A **75% SAVING** IN CLEANER COST

**Improved
Oakite Compound No. 88
banishes road-soil
— even coach windows
come out spotless**

The coach-washing compound used formerly at one terminal washed away accumulated oil, grease and crater dust all right. But while it solved one problem, it created another. Car sides and windows streaked badly. Dissatisfied with results, the company called Oakite.

The Oakite Technical Representative recommended Oakite Compound No. 88 for the job. He lent a hand—first, in seeing that the material was used properly; and, then, in making needed adjustments at the washer to get maximum results. In the first trial, a 3 ounce per gallon solution showed a big improvement. Not satisfied, the Oakite man reduced the concentration to 1 ounce. While this eliminated all streaking, it did not remove all dirt. So, 1½ ounces were used. That did it! With 125 cars washed that night, morning inspection revealed 125 shining examples of cleaning efficiency. Sides were streak-free, glass sparkled, dirt had vanished.

What's more, the cars not only were cleaned better, but also at 75% less materials-cost—each car taking about 10¢ worth of material instead of the former 45¢.



Oakite has materials for manual and automatic methods that speed and simplify car washing.

Proving that . . . in railroad cleaning, it pays to call in Oakite, because you get cleaning results, and not just cleaning materials.

IDEAS FOR SAVING in maintenance cleaning are given in this 56-page Booklet No. F-8055. Data include methods for cleaning running gear, filters, Diesel units, electrical equipment, and other tedious, time-consuming yard problems. For your free copy write Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.

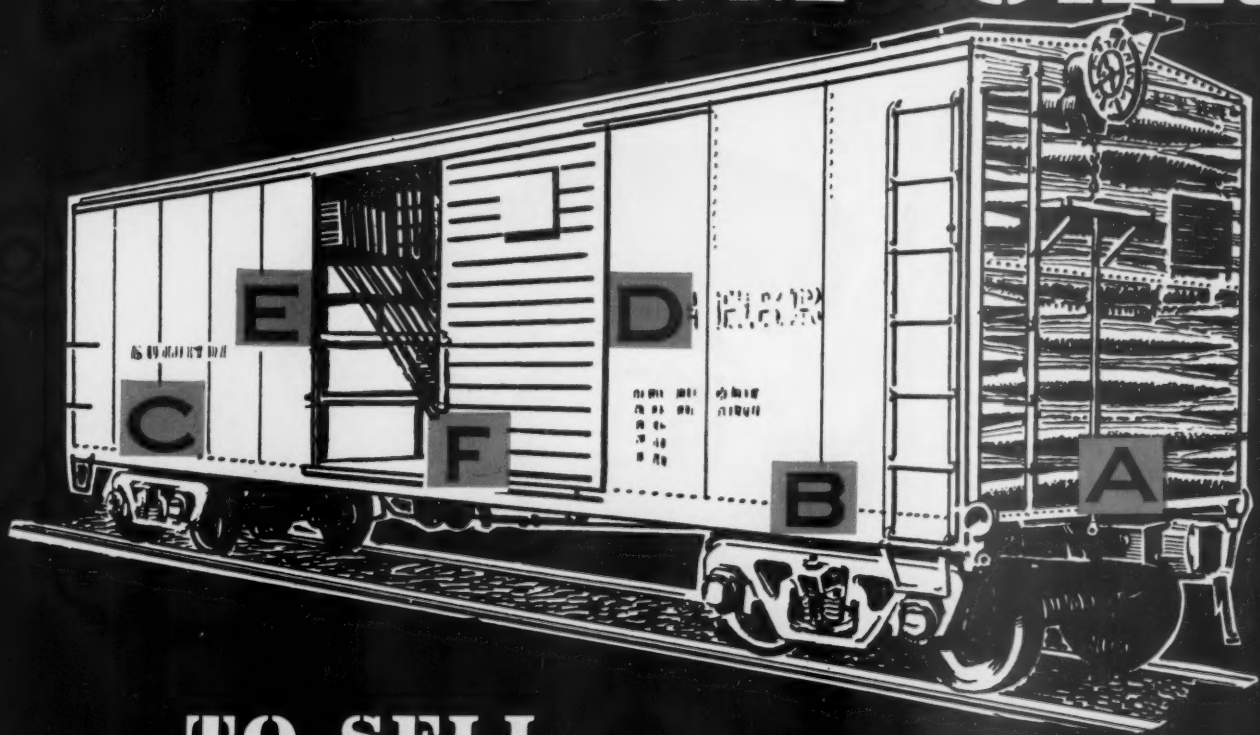


OAKITE PRODUCTS, INC., 46 RECTOR STREET, NEW YORK 6, N. Y.
In Canada: Oakite Products of Canada, Ltd., 65 Front St. East, Toronto, Ont.

OAKITE®

RAILWAY DIVISION

'PREMIUM' CAR



TO SELL 'PREMIUM FREIGHT SERVICE'

HERE'S a car to carry premium-freight to build traffic that pays a profit. Cushion Underframe equipped **a** it protects lading against excessive impacts. With improved trucks **b** and improved bearings **c** it is a smooth riding car. Extra wide doors **d** facilitate mechanical loading. Load retainers **e** reduce shifting and surfaced floors **f** are smooth and clean. Every device is proven . . . the protection afforded actual. It is the freight car of tomorrow ready today.

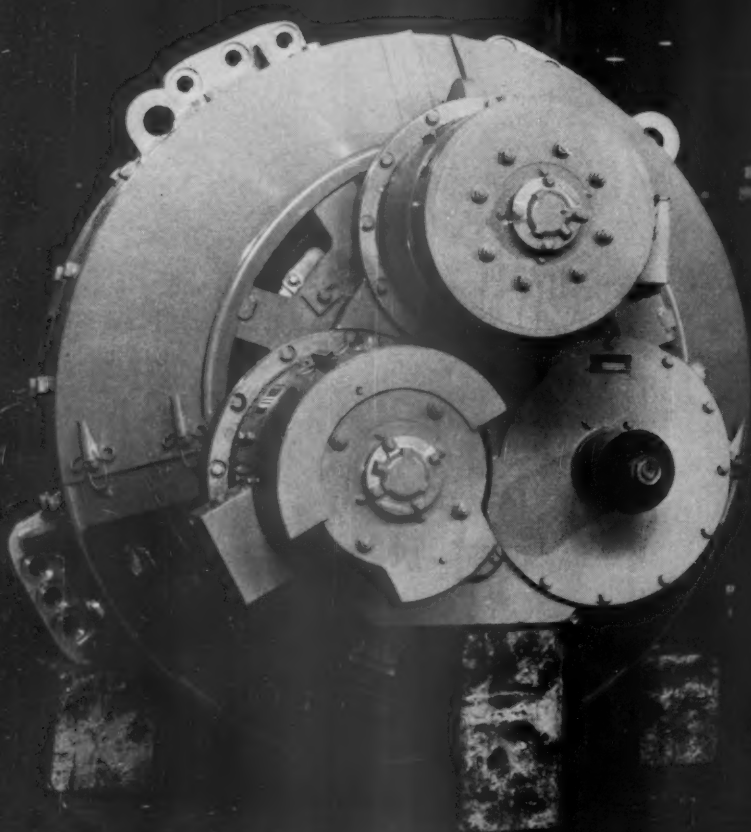
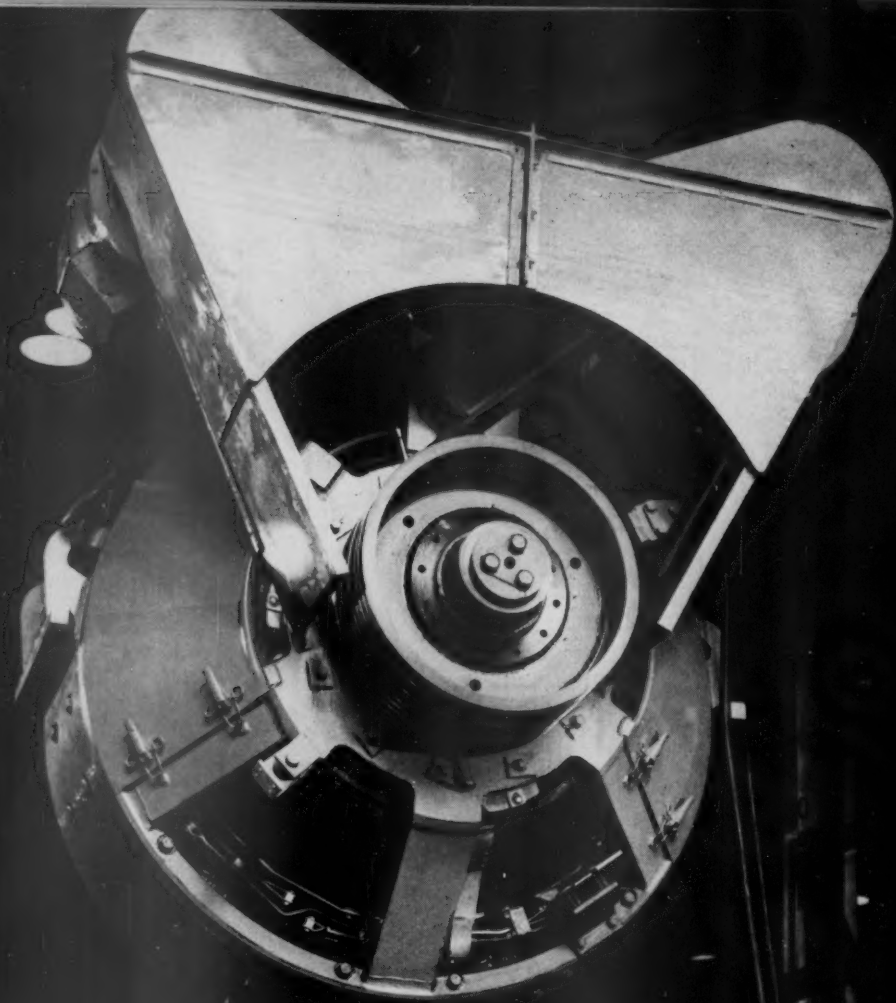
WAUGH

WAUGH EQUIPMENT COMPANY 420 Lexington Ave., New York 17, N. Y.
CHICAGO • ST. LOUIS • CANADIAN WAUGH EQUIPMENT COMPANY, MONTREAL

A **WAUGH**
HIGH CAPACITY
100,000 CARS
Waugh Cushion Underframe Equipped

Cushion Underframe

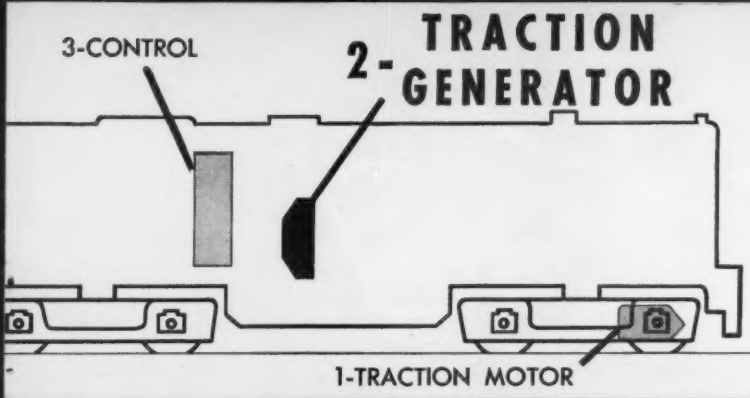
The only Cushion Underframe that eliminates free-slack, the Waugh High Capacity Cushion Underframe protects cars and lading at impact speeds far above the closing speed of conventional draft gears. Studies indicate that this cushioning device will cut lading damage cost and car repair costs by half. Inquiries invited.



Highly versatile, G-E generators are equally adaptable to gear or belted auxiliaries and can be used with either solid or flexible engine coupling.

GENERAL  ELECTRIC

3 REASONS WHY THE G-E TRACTION SYSTEM SETS THE INDUSTRY STANDARD



THREE SUPERIOR COMPONENTS, installed as an integrated system, help you get rugged, flexible motive power that assures better locomotive utilization and easier maintenance.

Most reliable in railroad service today . . .

HOW G.E. BUILDS TRACTION GENERATORS TO REDUCE LOCOMOTIVE ROAD FAILURES

Flashovers occur on all locomotives. However, road failures due to generator flashovers are practically unknown on locomotives equipped with G-E traction generators. In most cases, if a G-E generator flashes over, it simply recovers and the locomotive continues its run. This means less repair time and greater locomotive availability.

RUGGED DESIGN. Features that assure low flashover damage in G-E traction generators include: inherently high machine stability; mycalex brush holder insulators which unlike the porcelain insulators in other generators will not shatter during flashover; and, a brush holder shield that drastically reduces damage to the brush rigging.

SIMPLE CONSTRUCTION. G-E traction generators are simple in construction. They are self-ventilated machines and do not require separate blowers. While other machines have as many as six field windings, the G-E generator has only three—a real contribution to easier maintenance.

Ask your G-E Apparatus Sales Representative for more information about this generator—one of the superior components of the traction system that sets the industry standard. For G.E.'s new color film "The ABC of Flashovers" write Section 115-4A, General Electric Company, Schenectady 5, New York.

Progress Is Our Most Important Product

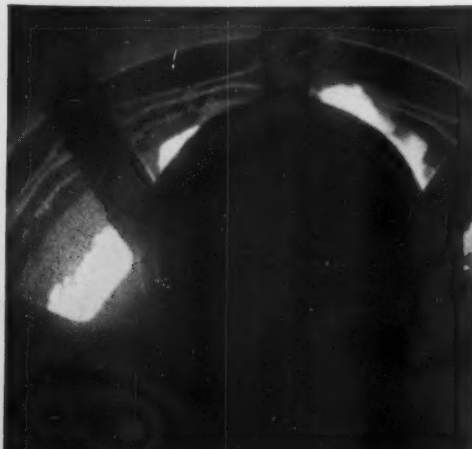
GENERAL  ELECTRIC

These high-speed photos from G.E.'s revolutionary film, "The ABC of Flashovers," show accurately what happens when a generator is flashed over.

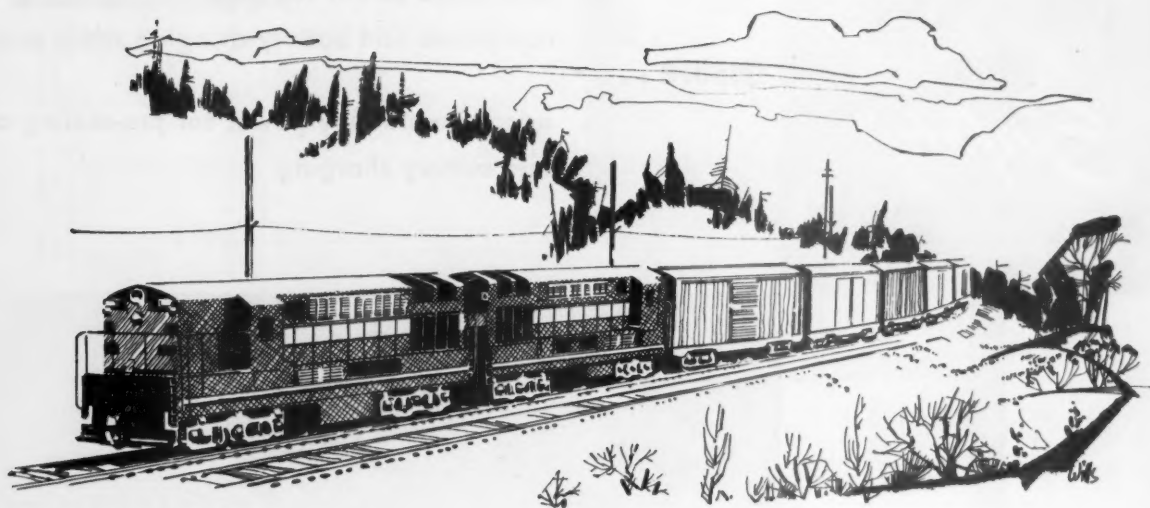
1. The flash begins its path over the commutator of a standard production generator.

2. Chain-like reaction next occurs as conductive gases erupt and blaze across the entire commutator.

3. Climax is reached in violent explosion. Generator took over 400 flashovers in test.







Four Times the Cylinder Life

Improvement of the Opposed-Piston engine—in design, manufacture and material—is a continuing research project at Fairbanks-Morse.

These research dollars and man-hours have perfected the improved porous chrome cylinder liners now available on all Opposed-Piston engines. O-P liners now give four times the cylinder life.

This is but another O-P Improvement Dividend at no increase in cost, which makes Fairbanks-Morse locomotives your soundest motive power investment. Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.



FAIRBANKS-MORSE

a name worth remembering when you want the best

DIESEL LOCOMOTIVES AND ENGINES • RAIL CARS AND RAILROAD EQUIPMENT
ELECTRICAL MACHINERY • PUMPS • SCALES • WATER SERVICE EQUIPMENT • MAGNETOS

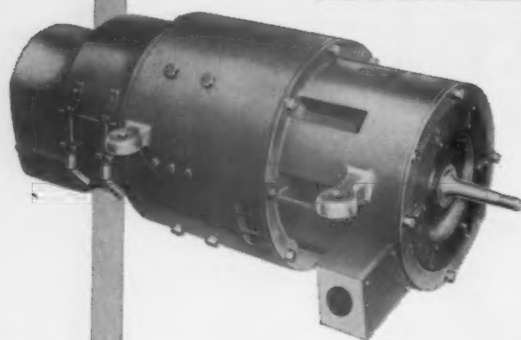
"Safety"
GENEMOTORS
plus
"Safety"
CONTROL EQUIPMENT

assure . . .

continuous power for all air conditioning, electrical equipment and battery charging while cars are en route

adequate standby power for pre-cooling cars and battery charging

"Safety" GENEMOTORS plus
"SAFETY" CONTROL EQUIPMENT
equal UNPARALLELED PERFORMANCE!!!

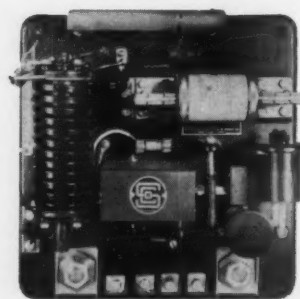


"SAFETY" GENEMOTORS . . .

are unsurpassed power plants for modern passenger cars. They are designed and precision manufactured for long life with minimum maintenance.

"SAFETY" CONTROL EQUIPMENT . . .

uncomplicated and automatic . . . provides constant voltage regulation and positive current limit for maximum equipment protection . . . lengthens battery life.



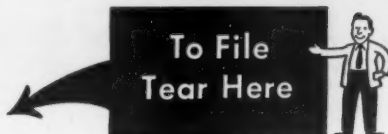
Over 5,000 "Safety" Genemotor and Control Equipment applications on railroads throughout the United States, Canada and Mexico are actual proof of unparalleled performance in service.

"Safety" Genemotors are available in capacities of 25, 30 and 35 kw and in 40, 80 and 140 volts nominal ratings, with 20 or 32 HP AC, 60 cycle, 220 volt motors . . . 12 to 20 kw output on standby.

THE **SAFETY** CAR HEATING AND LIGHTING **COMPANY** INC.

NEW YORK • CHICAGO • PHILADELPHIA • ST. LOUIS • SAN FRANCISCO • NEW HAVEN • MONTREAL

SAFETY COMPANY PRODUCTS INCLUDE: Air-conditioning Equipment • Genemotors • Generators • Fans • Regulators • Blower Units
Lighting Fixtures • Switchboards • Luggage Racks • Motor Alternators • Dynamotors • Motor Generators • Dual Voltage MG Sets



REVENUES AND EXPENSES OF RAILWAYS

(Dollar figures are stated in thousands; i.e., with last three digits omitted)

MONTH OF JANUARY OF CALENDAR YEAR, 1955

Name of Road	Average mileage operated during period	Operating Revenues (thousands)				Operating Expenses (thousands)				Operating Ratio (percent)				Net income from operations	
		1955	1954	1953	1952	1955	1954	1953	1952	1955	1954	1953	1952	1955	1954
Akron, Canton & Youngstown	171	\$433	\$403	\$403	\$403	\$317	\$317	\$317	\$317	73.9	78.0	78.0	78.0	\$115	\$115
Atchafalaya, Topeka & Santa Fe	13,098	\$3,317	\$4,075	\$4,124	\$4,124	\$338	\$307	\$28	\$3	75.5	75.5	75.5	75.5	\$451	\$451
Atlanta & St. Andrews Bay	92	333	338	307	28	43	48	6	59	50.2	45.0	45.0	45.0	63	63
Atlanta & West Point	83	244	42	354	325	43	23	6	65	77.5	93.1	93.1	93.1	22	22
Western of Alabama	133	299	41	389	353	53	55	7	73	75.3	86.9	86.9	86.9	54	54
Atlantic & Danville	205	135	138	128	22	25	2	6	11	68.0	76.7	76.7	76.7	8	8
Atlantic Coast Line	5,344	10,478	1,912	13,698	13,653	2,247	1,883	150	3,005	78.6	83.6	83.6	83.6	912	912
Charleston & Western Carolina	343	575	1,550	30,226	31,719	3,214	3,766	463	5,533	80.8	80.8	80.8	80.8	50	50
Baltimore & Ohio	6,184	26,579	1,550	30,226	31,719	3,214	3,766	463	5,533	80.8	80.8	80.8	80.8	50	50
Staten Island Rapid Transit	29	179	54	236	235	41	45	12	24	97.9	97.9	97.9	97.9	40	40
Buam & Aroostook	602	1,131	29	1,197	1,503	325	325	16	217	90.2	90.2	90.2	90.2	234	234
Bremer & Lake Erie	208	1,164	1,120	1,286	181	217	17	435	635	142	103.3	103.3	103.3	54	54
Boston & Maine	1,576	5,108	859	6,732	6,628	941	1,336	144	993	75.6	75.6	75.6	75.6	291	291
Cambria & Indiana	35	149	149	113	16	17	1	66	93	92.6	92.6	92.6	92.6	38	38
Canadian Pacific Lines in Maine	234	718	67	821	706	89	59	5	102	67.1	67.1	67.1	67.1	265	265
Canadian Pacific Lines in Vermont	90	189	11	219	223	74	39	40	32	107.9	107.9	107.9	107.9	182	182
Central of Georgia	1,764	3,128	164	3,603	3,295	511	513	36	591	94.6	94.6	94.6	94.6	85	85
Central of New Jersey	613	3,150	478	4,563	4,693	516	518	92	886	81.3	81.3	81.3	81.3	453	453
Central Vermont	422	729	59	860	919	115	103	16	118	73.1	73.1	73.1	73.1	40	40
Chesapeake & Ohio	5,128	24,817	561	26,514	24,240	3,363	3,579	377	4,809	70.4	70.4	70.4	70.4	50	50
Chicago & Eastern Illinois	868	2,435	247	2,951	2,742	336	342	24	443	81.2	81.2	81.2	81.2	675	675
Chicago & Illinois Midland	730	680	1,101	694	1,537	364	470	5	123	93.9	93.9	93.9	93.9	1,082	1,082
Chicago & North Western	1,525	15,071	1,525	15,071	15,071	2,048	2,167	395	3,440	79.3	79.3	79.3	79.3	3,842	3,842
Chicago, Burlington & Quincy	8,858	15,071	1,525	15,071	15,071	2,048	2,167	395	3,440	79.3	79.3	79.3	79.3	3,842	3,842
Chicago Great Western	1,470	2,581	6	2,750	2,661	413	386	43	386	69.3	69.3	69.3	69.3	891	891
Chicago, Indianapolis & Louisville	541	1,507	69	1,728	1,645	265	279	19	264	78.7	78.7	78.7	78.7	330	330
Chicago, Milwaukee & St. Paul	10,641	15,483	1,081	18,463	17,498	2,700	2,957	400	3,872	80.4	80.4	80.4	80.4	2,709	2,709
Chicago, Rock Island & Pacific	1,924	1,510	1,510	1,510	1,510	1,510	1,510	1,510	1,510	91.7	91.7	91.7	91.7	1,400	1,400
Chicago, St. Paul, Minn. & Omaha	1,304	1,894	1,894	1,894	1,894	1,894	1,894	1,894	1,894	91.7	91.7	91.7	91.7	1,400	1,400
Cincinnati	304	1,894	1,894	1,894	1,894	1,894	1,894	1,894	1,894	91.7	91.7	91.7	91.7	1,400	1,400
Colorado & Southern	1,038	1,022	137	1,212	1,076	172	107	17	179	73.5	73.5	73.5	73.5	321	321
Ft. Worth & Denver	1,038	1,022	137	1,212	1,076	172	107	17	179	73.5	73.5	73.5	73.5	321	321
Colorado & Wyoming	40	169	169	169	169	169	169	169	169	92.6	92.6	92.6	92.6	17	17
Delaware & Hudson	792	3,938	172	4,235	3,919	538	568	52	781	86.9	86.9	86.9	86.9	1,109	1,109
Delaware, Lackawanna & Western	962	5,158	816	6,560	6,730	678	764	133	974	82.2	82.2	82.2	82.2	585	585
Denver & Rio Grande Western	2,165	5,361	212	5,753	5,726	445	500	96	927	83.6	83.6	83.6	83.6	1,248	1,248
Detroit & Toledo	232	1,522	152	1,522	1,522	1,522	1,522	1,522	1,522	91.7	91.7	91.7	91.7	1,400	1,400
Detroit, Toledo & Iron Range	464	1,569	1,569	1,569	1,569	1,569	1,569	1,569	1,569	91.7	91.7	91.7	91.7	1,400	1,400
Duluth, Missabe & Iron Range	569	237	237	237	237	237	237	237	237	91.7	91.7	91.7	91.7	1,400	1,400
Duluth, South Shore & Atlantic	553	499	499	499	499	499	499	499	499	91.7	91.7	91.7	91.7	1,400	1,400
Duluth, Winnipeg & Pacific	175	504	1	511	442	53	56	4	68	82.5	82.5	82.5	82.5	39	39
Edison, Joliet & Eastern	2,224	10,698	588	12,181	12,734	1,190	1,533	266	1,995	80.4	80.4	80.4	80.4	1,508	1,508
Florida East Coast	571	2,456	741	3,546	3,120	417	346	49	530	76.1	76.1	76.1	76.1	317	317
Georgia Railroad	321	595	23	706	694	109	135	9	126	86.1	86.1	86.1	86.1	98	98
Georgia & Florida	332	272	272	272	272	272	272	272	272	91.1	91.1	91.1	91.1	14	14
Grand Trunk Western	952	1,448	226	4,707	4,542	560	629	53	786	82.3	82.3	82.3	82.3	316	316
Great Northern	172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	1,172	91.7	91.7	91.7	91.7	1,400	1,400
Green Bay & Western	8,300	14,824	742	16,685	14,200	2,472	2,814	360	4,017	106.5	106.5	106.5	106.5	24	24
Gulf, Mobile & Ohio	2,254	3,166	316	3,24	3,40	47	58	4	44	74.8	74.8	74.8	74.8	85	85
Illinois Central	6,539	18,082	1,851	22,175	23,315	3,137	3,403	381	3,950	77.3	77.3	77.3	77.3	2,843	2,843
Illinois Terminal	355	705	47	859	836	101	133	24	136	87.1	87.1	87.1	87.1	62	62
Kansas City Southern	891	3,025	102	3,453	3,510	308	287	38	415	75.6	75.6	75.6	75.6	1,455	1,455
Kansas, Oklahoma & Gulf	327	345	345	345	345	345	345	345	345	91.7	91.7	91.7	91.7	601	601
Lake Superior & Ishpeming	156	44	44	44	44	44	44	44	44	120.5	120.5	120.5	120.5	33	33
Lehigh & Hudson River	96	261	261	261	261	261	261	261	261	91.7	91.7	91.7	91.7	23	23
Lehigh & New England	180	430	430	430	430	430	430	430	430	91.7	91.7	91.7	91.7	27	27
Lehigh Valley	1,154	4,702	292	5,275	5,207	648	759	96	957	88.8	88.8	88.8	88.8	322	322
Long Island	360	928	3,590	4,763	4,151	623	654	85	945	102.3	102.3	102.3	102.3	303	303

**CATERPILLAR ANNOUNCES
THE**

NEW D7 SERIES C

**MORE POWER,
SMOOTHER
PERFORMANCE**



NOW 102 DRAWBAR HP! NOW A VIBRATION BALANCER ON THE ENGINE!

Here's the new CAT Diesel D7 Tractor... latest example of Caterpillar Leadership in Action!*

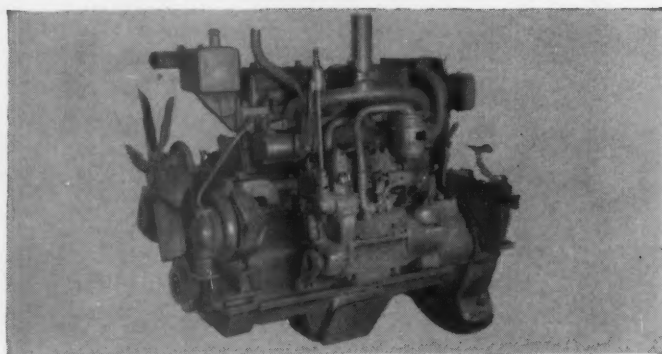
Drawbar HP increased to 102, engine HP to 128 (at 1200 r.p.m.).

Vibration balancer on the 4-cylinder engine now gives all the smoothness of 6-cylinder performance.

Drawbar pull now 28,700 pounds maximum.

New starting engine has more power for surer, faster starts in all weather, and simple single-lever control for easier operation.

New "water quench" process for hardening track shoes almost doubles shoe life.



New 128-HP engine features improved fuel injection system, flanged center main bearing to take crankshaft thrust, many other advances.

The new D7 Series C is ready now to give you more profitable production than ever before. Call your Caterpillar Dealer today for a demonstration!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS, U.S.A.

I would like additional information on the new D7 Series C

Name _____

Company _____

Street _____

City _____ Zone _____ State _____

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

**THE NEW D7...MORE
POWER, SMOOTHER
PERFORMANCE**

REVENUES AND EXPENSES OF RAILWAYS

(Dollar figures are stated in thousands; i.e., with last three digits omitted)

MONTH OF JANUARY OF CALENDAR YEAR, 1955

Average mileage operated during period	Name of Road	Operating Revenues				Mant. Way and Structures				Operating Expenses				Net from railway operation	Net railway operating income						
		Freight		Pass.		Total		Total		Total		Total									
		1954	1955	1954	1955	1954	1955	1954	1955	1954	1955	1954	1955								
753	Louisiana & Arkansas	2,115	2,252	2,183	2,051	271	256	269	91	70	603	1,214	1,309	53.9	60.0	1,037	441	517	431		
4,733	Louisville & Nashville	14,422	931	16,671	17,336	2,151	2,765	244	3,102	3,628	837	348	5,819	13,789	72.6	79.5	4,574	2,568	2,278		
944	Maine Central	1,407	92	2,029	2,143	395	419	27	333	396	78	20	743	1,076	1,680	77.7	78.4	453	193	185	
1,397	Maine Southern	1,612	8	1,601	1,413	248	241	26	270	263	76	108	589	1,341	1,492	74.5	74.1	31	122	16	
3,224	Minneapolis, St. Paul & Sault Ste. Marie	2,505	56	2,713	2,333	529	574	52	545	625	116	83	1,116	2,402	2,613	88.6	112.0	310	201	134	
148	Mississippi Central	187	...	191	204	55	63	2	27	28	6	15	58	165	167	86.5	81.5	26	7	8	
172	Missouri Illinois	430	...	433	354	49	66	...	69	91	28	12	115	256	273	59.1	77.1	177	64	118	
3,241	Missouri Pacific	14,324	305	15,606	15,938	2,715	2,759	253	3,498	3,856	984	290	2,358	4,537	4,920	80.9	82.6	1,069	393	392	
1,103	Missouri Western	1,324	...	1,324	1,103	164	164	475	475	478	122	93	1,062	2,297	2,457	84.5	85.9	409	114	225	
1,723	Great Northern	2,271	99	2,643	2,627	510	475	45	488	529	114	62	1,154	2,497	2,634	70.2	75.0	1,060	155	645	
1,124	Gulf Coast Lines	3,242	...	3,557	3,509	616	673	45	488	529	114	62	1,154	2,497	2,634	70.2	75.0	1,060	155	645	
177	Monongahela	462	...	465	487	58	59	16	57	63	14	1	161	282	312	60.6	64.1	183	27	39	
51	Montour	1,110	...	1,227	1,278	13	20	2	36	36	17	1	50	116	137	91.0	98.4	11	29	34	
10,713	New York, Choptank & St. Louis	42,561	138	58,566	57,978	5,677	7,315	476	9,634	13,110	2,281	1,060	26,811	46,559	52,711	79.5	90.9	12,007	4,529	378	
1,043	New York Central	9,162	9,162	58,566	57,978	5,677	7,315	476	9,634	13,110	2,281	1,060	26,811	46,559	52,711	79.5	90.9	12,007	4,529	378	
221	Pittsburgh & Lake Erie	2,628	76	2,829	3,153	398	408	42	702	991	288	77	1,010	2,445	2,631	86.4	89.8	385	547	805	
2,179	New York, York & St. Louis	11,130	151	11,632	11,613	1,311	1,369	137	1,993	2,057	360	337	4,356	8,440	8,506	72.6	73.3	3,192	1,948	1,303	
1,769	New York, New Haven & Hartford	6,795	3,996	12,144	12,114	1,457	1,564	261	1,650	1,937	177	211	5,578	9,757	10,235	80.3	84.5	2,386	850	503	
541	New York, New York & Connecticut	330	...	352	328	96	84	25	21	20	...	...	...	216	236	52.6	51.5	135	39	81
521	New York, Oneida & Western	462	...	462	432	53	53	5	60	61	13	...	...	218	266	69.3	85.2	162	58	51
120	New York, Susquehanna & Western	462	...	462	432	53	53	5	60	61	13	...	...	218	266	69.3	85.2	162	58	51
2,133	Norfolk & Western	13,634	289	14,581	13,716	2,192	2,268	304	3,169	3,505	687	311	4,558	10,953	11,528	75.1	84.0	3,628	2,502	1,988	
605	Norfolk Southern	755	...	769	733	162	161	13	113	102	28	49	245	623	622	81.0	84.8	147	71	26	
6,866	Northern Pacific	11,349	526	12,840	11,258	1,556	2,105	262	2,642	3,030	565	336	5,803	11,124	12,195	86.6	108.3	1,716	1,327	573	
132	Northwestern Pacific	1,062	3	1,062	222	15	15	2	104	84	17	40	47	52.8	53.0	36	16	178
1,305	Ohio Valley & Alaska	690	...	690	639	105	90	24	119	124	36	59	171	498	493	92.5	76.1	106	76	104	
1,118	Pennsylvania Reading & Potomac	1,435	555	2,288	2,342	310	312	28	312	332	67	21	361	1,560	1,604	68.2	68.5	231	351	226	
392	Richmond, Fredericksburg & Potomac	350	...	388	362	92	60	17	47	70	13	23	153	340	343	87.6	91.9	48	24	29	
267	Rutland	167	...	177	184	71	82	4	17	11	3	2	73	180	176	102.0	95.8	15	15	34	
4,601	Sacramento Northern	8,081	452	9,250	9,960	1,373	1,526	159	1,773	1,675	527	350	3,635	7,657	7,992	82.8	80.2	1,592	693	830	
1,325	St. Louis San Francisco	600	...	605	639	105	90	24	119	124	36	59	171	498	493	92.5	76.1	106	76	104	
157	St. Louis San Francisco & Texas	363	5	3,469	3,59	44	6	24	28	28	103	27	155	259	275	65.5	76.4	131	49	24	
1,561	St. Louis Southwestern Lines	4,932	15	6,662	4,956	625	744	61	573	696	103	174	1,519	3,051	3,274	66.5	66.1	1,610	686	632	
4,064	Seaboard Air Line	11,208	1,196	13,513	13,562	2,116	2,087	190	2,322	2,539	371	4312	9,653	9,546	71.4	72.0	3,360	1,449	2,127	1,994	
6,289	Southern Railway	18,407	1,510	21,581	20,444	2,738	3,018	220	3,631	4,229	766	410	6,648	14,347	15,282	66.5	74.7	7,234	3,416	3,334	
326	Alabama Great Southern	1,129	63	1,318	1,432	217	233	30	280	308	57	32	449	1,057	1,066	80.3	74.4	261	95	121	
337	Chgo., New Orleans & Texas Pacific	3,010	190	3,406	3,529	489	464	42	645	765	133	821	808	2,156	2,343	61.2	71.9	1,250	618	532	
475	Georgia Southern & Florida	691	92	866	793	252	195	9	72	76	4	19	280	667	603	77.1	76.1	199	43	52	
204	New Orleans & Northern	681	44	778	995	177	147	19	141	145	42	20	217	613	559	78.8	56.2	165	116	162	
8,130	Southern Pacific	32,312	2,832	37,666	35,666	4,771	4,379	464	8,091	7,872	1,888	837	15,558	31,260	30,917	83.0	86.7	6,406	2,951	2,899	
4,315	Texas & New Orleans	9,228	479	10,313	11,836	1,806	1,36	141	1,337	1,557	149	882	3,829	7,269	8,302	76.9	73.7	2,384	874	428	
1,540	Spokane International	2,566	...	2,485	2,079	49	48	2	26	22	10	6	65	157	150	63.4	76.2	90	36	35	
934	Spokane, Portland & Seattle	2,566	...	2,485	2,079	49	48	2	26	22	10	6	65	157	150	63.4	76.2	90	36	35	
286	Tennessee Central	374	1	386	390	66	70	5	59	60	22	15	127	292	299	75.6	76.7	94	26	26	
8	Texas & Northern	121	...	136	93	4	...	...	97	1,117	246	193	2,266	4,724	4,935	32.0	74.3	2,004	644	874
1,831	Texas & Pacific	5,833	366	6,128	6,442	943	1,040	89	977	1,117	246	193	2,266	4,724	4,935	32.0	74.3	2,004	644	874	
161	Texas Mexican	215	...	233	214	47	57	6	28	28	10	10	65	167	174	71.7	74.2	66	30	17	
9,813	Tulsa, Fort & Western	32,127	2,243	37,047	37,013	4,967	4,239	439	7,554	7,906	1,606	1,207	13,542	29,357	30,145	79.2	81.3	7,690	4,390	1,811	
99	Utah	118	...	130	98	15	16	2	34	45	8	1	38	951	1,06	50.9	108.2	23	9	19	
611	Virginian	3,385	...	3,502	3,140	401	426	61	710	727	199	51	725	1,981	2,002	86.6	66.3	1,521	833	195	
2,393	Wabash	7,702	414	8,781	9,052	1,026	1,102	101	1,261	1,518	362	302	3,310	6,785	7,158	77.3	79.1	1,996	662	797	
274	Western Maryland	857	...	865	812	494	532	46	610	706	203	106	310	2,853	2,915	71.3	71.3	1,056	20	64	
1,193	Western Piedmont	3,307	154	3,356	3,610	617	644	87	611	669	178	219	1,302	3,013	3,025	85.2	83.8	523	249	256	
1,042	Western Piedmont	1,330	31	2,292	2,115	263	346	38	360	450	85	73	976	1,780	1,966	77.7	77.7	512	149	223	

Time
...rides on
your side with



Streamlite HAIRINSUL

LOW CONDUCTIVITY... Thoroughly washed and sterilized, all-hair heat barrier. Rated conductivity —.25 btu per square foot, per hour, per degree F., per inch thick.

LIGHT WEIGHT... Advanced processing methods reduce weight of STREAMLITE HAIRINSUL by 40%.

PERMANENT... Does not disintegrate when wet, resists absorption. Will not shake down, is fire-resistant and odorless.

EASY TO INSTALL... Blankets may be applied to car wall in one piece, from sill to plate and from one side door to the other. Self-supporting in wall sections between fasteners.

COMPLETE RANGE... STREAMLITE HAIRINSUL is available 1/2" to 4" thick, up to 127" wide. Stitched on 5" or 10" centers between two layers of reinforced asphalt laminated paper. Other weights and facings available.

HIGH SALVAGE VALUE... The all-hair content does not deteriorate with age; therefore has high salvage value. No other type of insulation offers a comparable saving.

... because time has yet to destroy or impair the high insulating efficiency of
Streamlite HAIRINSUL

Even after twenty or more years of service, STREAMLITE HAIRINSUL has been removed from refrigerator cars and re-used in new cars without need for further processing or renovating.

STREAMLITE HAIRINSUL, the all-hair insulation that actually weighs 40% less and gives so much more in efficiency and economy is a one-time investment.

At left are still more reasons why leading car builders demand STREAMLITE HAIRINSUL for efficient insulations. Write for complete data.

MERCHANDISE MART, CHICAGO 54



SETS THE STANDARD BY WHICH ALL OTHER REFRIGERATOR CAR INSULATIONS ARE JUDGED

TYPE **F** INTERLOCKING COUPLER and ATTACHMENTS

plus **Buckeye** **DEPENDABILITY**



COUPLER F-70

YOKE Y-45

FOLLOWER Y-46



STRIKING CASTING
... with precompressed
flexible coupler carrier

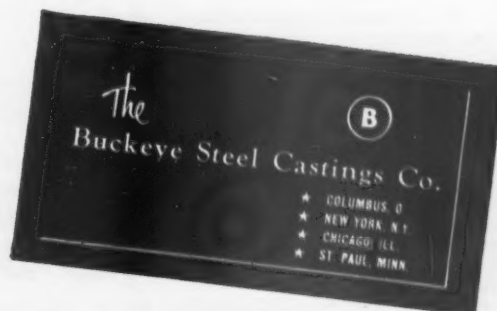
**... adds up to longer,
trouble-free service!**

- New Safety Shelf—to support mated coupler in event of pullout.
- Interlocking—Guard arm and aligning wings similar to type H Coupler.
- Reduced free slack.
- Improved positive anti-creep.
- Easier operation.
- Increased strength.
- Reduced wear.
- Coupler, Yoke, Follower, and Striker interchangeable as a group with present standards.

FOR COMPLETE INFORMATION... CALL or WRITE

Refer Adv. No. 11878

Ask for Bulletin No 202..



"Round-the-Corner" Service

FOR YOUR SPECIALIZED PETROLEUM NEEDS!



23 Flying Red Horse product blending plants across the U. S. can save you time, trouble and money!

Each of the Flying Red Horses on the map above represents a complete Blending Plant—a dependable source of supply for your petroleum needs.

At any of these 23 plants—far more than any other oil company maintains—you can get correct products for your particular operations. Even if you require some specialized product—a product that must be tailor-made to your specifications—these plants can supply it with minimum delay.

This exclusive "round-the-corner" service can benefit you in many ways...

1. Reduced inventory—you need not stock up excessively since our plants are within easy access. This simplifies inventory management.

2. Lower transportation costs—because we have 23 plants, all strategically located, only a short haul is necessary to bring our products where they're wanted.

3. Faster delivery—there's a plant close enough to you to assure prompt delivery always.

4. Special requirements—emergency delivery or special formulation—your request is always handled promptly and efficiently.

5. Save money on empty containers—fewer containers to handle and less of a haul to return them saves you time, trouble and money.

Take advantage of this nation-wide network of railroad "service stations" to improve your operations—cut your costs. Get all the facts by writing to one of the addresses below.

SOCONY-VACUUM OIL CO., INC., and Affiliates:
MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

RAILROAD DIVISION

26 Broadway, New York 4, N. Y. • 59 East Van Buren Street, Chicago 5, Ill.



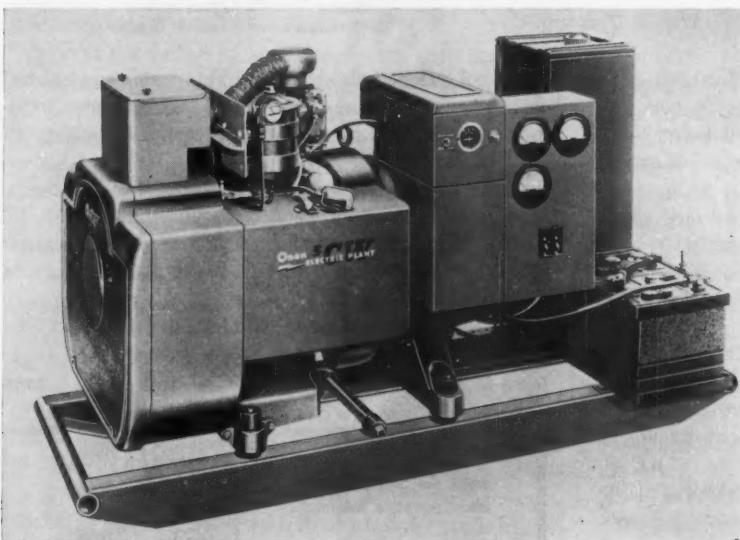
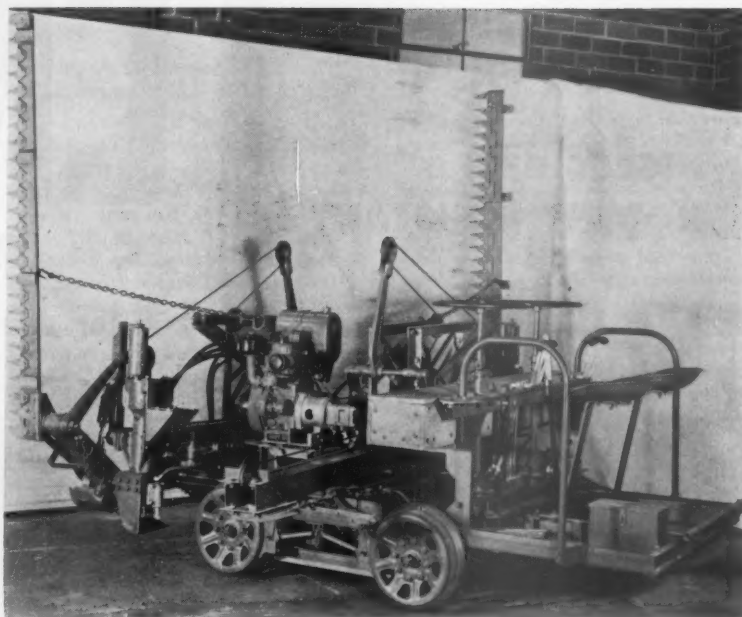
What's New in Products

Hydraulic-Powered Mower

A modification of the Fairmont M24 weed mower, the M24 Series F, provides hydraulic power for driving the sickles. To eliminate all belts and gearing used in the conventional drive, the new machine uses hydraulic motors which are connected directly to the pitman-wheel shaft. The hydraulic system that powers these motors also supplies the power to raise and lower the cutter bars and to tilt the extension-beam guide towers.

One centrally located engine equipped with battery ignition and an electric starter drives a double vane-type hydraulic pump. Each half of the pump supplies power to one side of the machine, which is said to insure equal sickle speeds regardless of variations in the cutting load. The hydraulic system also includes a metallic-disc suction filter, multiple valve units, reservoir, micron low-pressure filter and hydraulic rams.

Standard equipment includes a manually operated hydraulic turntable and a power-sickle grinder. *Fairmont Railway Motors, Inc., Fairmont, Minn.* •



Packaged Kit for Electric Plant

Especially designed for the Model CW electric generating plant is a packaged-kit assembly which enables the plant to be completely self-contained and properly equipped for all types of portable service under all weather con-

ditions. The packaged-kit assembly consists of a sturdily constructed skid on which the generating plant is mounted, a battery rack, fuel tank and batteries. A 16-gage sheet-steel weatherproof housing is assembled on and supported by the skid base.

The completely housed unit can be supplied with a four-wheel dolly kit or

on a two-wheel trailer. The dolly consists of two fixed-axle wheels and two single-bearing swivel wheels, all of which have ball bearings and 8-in. by 2-in. solid hard-rubber tires. The trailer kit contains an axle, drawbar with a retractable hinged deadstand and a clevis-type hitch, underslung semi-elliptic four-leaf springs, conventional drop-center wheels with tapered Timken wheel-bearings and 6.00 by 16 4-ply tires. Fenders are also included. *D. W. Onan & Sons, Inc., Minneapolis 14, Minn.* •

Improved Track Cribber

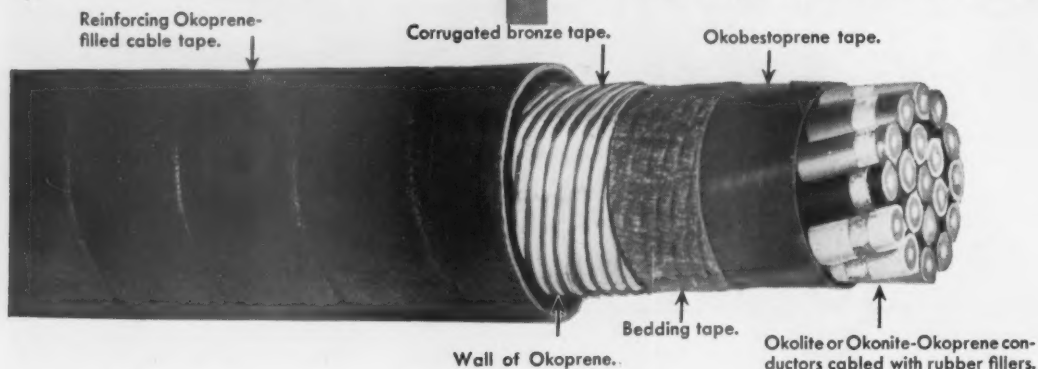
Standard equipment on the Pullman-Standard Power Track Cribber now includes an automatic air-type shock-absorber system. This newly designed system is said to absorb the unused energy of the cribber crosshead at the end of the crosshead stroke. It is reported to greatly reduce shock and subsequently reduce overall machine maintenance. The new system consists of two air cylinders and a simple valve arrangement which controls their action. It is reported that the device was successfully tested on five railroads during 1954. *Pullman-Standard Car Manufacturing Company, 79 E. Adams st., Chicago 3.* •

- ➔ **HIGH COMPRESSIVE STRENGTH**
- ➔ **TERMITE-PROOF**
- ➔ **INSECT AND RODENT RESISTANT**
- ➔ **LIGHT WEIGHT**

New!

OKONITE CM-OT CABLE

for direct burial installations



CM-OT is a light-weight, metallic-tape armored protective covering designed to sheath multi-conductor signal, control and power cables directly buried in the earth. It consists of a 5-mil corrugated bronze tape and a wall of Okoprene reinforced with an Okoprene-filled cable tape.

The corrugated bronze tape provides extra strength in the composite sheath. The corrugations give exceptionally high compressive strength which is a prime consideration in direct burial applications. It constitutes an excellent termite and insect barrier and provides mechanical protection against attack by gophers, rodents and small animals. It contributes to the moisture resistance of the cable and prolongs its life in underground service.

This light-weight construction is much more flexible than the conventional metallic type parkway finish.

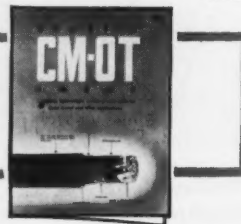
Unlike flat-taped constructions, this design can be bent around a radius close to that of its own diameter without buckling the metal tape and causing damage to the insulation.

At terminations the corrugated bronze tape is easily unwrapped. The small bending radius enables CM-OT sheathed cables to be trained in congested junction boxes or relay cases and allows simple terminations where space is restricted.

For prices or more detailed information contact The Okonite Company, Passaic, New Jersey.

26508

Write for Bulletin 1086 for more complete information.



OKONITE



insulated cables

What Is a Subsidy, Anyhow?

J. M. Symes . . .
On October 25, 1954

Instead of seeking equity and fair play in transportation on the sound premise that the user should pay for the true cost of the service he demands and receives . . . perhaps we should be seeking equality of competitive opportunity on somewhat the same terms as that afforded our competition. Public interest requires that one thing or the other be done. Certainly it is not in the public interest to encourage the use of a high cost method of transport through subsidy, at the expense of a low cost method of transport that is not subsidized.

Wayne A. Johnston . . .
On February 23, 1955

We believe all subsidy to transportation is inherently evil. It has the immediate result of raising our taxes and of encouraging the less efficient at the expense of the more efficient. It has the equally dangerous long-range result of driving all transportation closer and closer into the arms of government operation and eventual socialism. On the Illinois Central we are not giving up the fight. Only in the defeat of subsidy can the railroads prove their true position as the most broadly useful and economic form of transportation.

E. G. Plowman . . .
On February 14, 1955

Just as they cannot continue to maintain loss creating service for the general public, similarly United States railroads and other common carriers cannot be expected to recover from peacetime freight rate revenues the cost of maintaining their equipment or facilities in readiness for defense needs.

This is a proper charge against our government for national defense reasons, and should be financed by the government from general taxation for defense, and not borne by carriers or by shippers.

Reading the quotations at the top of this page, from addressess by three eminent transportation executives, it might be concluded that there exists a considerable difference of opinion on the desirability of some kind of "government aid" to the railroads.

It is the belief of this paper that the disagreement, if any, lies more in indefinite terminology than in substance. Among the several dictionary definitions of "subsidy" the following two appear to be applicable. They are (a) "help, aid, assistance"; and (b) "financial aid furnished by a state or a public corporation in furtherance of an undertaking or the upkeep of a thing."

Where do subsidies, as thus defined, exist in transportation? There can be no doubt that toll-free waterways fall under definition (b). This definition also applies as regards highways and airways, insofar as user payments fail to cover total costs, including ad valorem taxes on highway and airport property, and taxes on earnings of securities by which these facilities are financed.

All railroad men that we know of are opposed to subsidies to waterway, airway and highway transportation—but only insofar as commercial carriers get the subsidies. That is to say, we have yet to meet a railroad man who advocates terminating all subsidies for highway transportation, to the extent that private motorists only may be the beneficiaries.

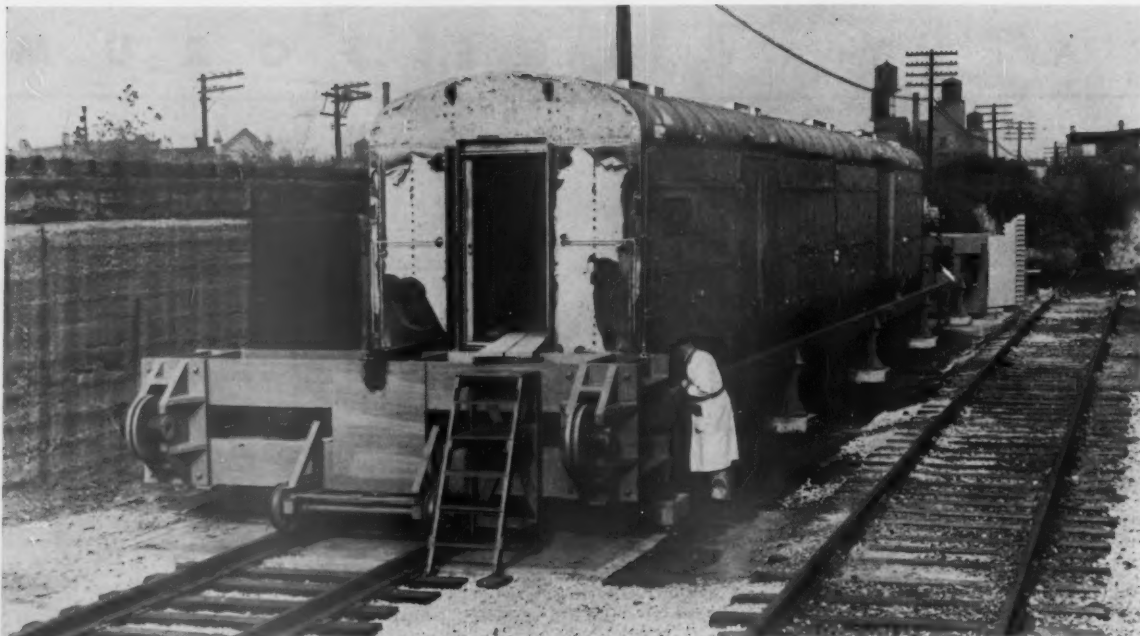
Another place where subsidies are found in transportation—this time under definition (a)—

is in the maintenance of passenger train and other railroad services at out-of-pocket losses. In such cases the subsidy comes from railroad owners and railroad freight shippers, and the recipients of the subsidy are (1) the users of this railroad service at less than cost and (2) the communities whose property values are sustained by railroad service which is operated at a loss.

Most railroad men would prefer to terminate this latter variety of subsidies by pulling off the red-ink service. Often, however, the affected communities will not permit such discontinuance. Where this is so, there are some railroad men who would rather keep the service going as a subsidy from railroad owners and freight shippers to these communities, than to call on the communities to terminate the subsidy by meeting the deficits.

To the economist (at least, to one of the pre-New Deal kind) a subsidy is a destroyer of economic choice through the guidance of the market place—and, hence, is an evil in itself, regardless of who pays it or who gets it. It is just as unsound, from an economic standpoint, for railroad owners and freight shippers to subsidize services to communities or to the government, as it is for government to subsidize other transportation.

In this paper's opinion, those railroad men are on sound ground who oppose seeking or accepting subsidies. But we likewise believe that those railroad men who also favor terminating subsidies by railroads to national, state and local governments are on equally sound ground.



COMPRESSION TEST machine from the beam end—Santa Fe baggage car being tested.

AAR Squeeze Tests Two ACF Cars

An aluminum dome-coach for the UP and a stainless steel baggage car for the Santa Fe meet full test requirements

DEFLECTION OF UP DOME-COACH CAR BODY

UNDER COMPRESSION LOAD, INCHES

Test No.	Pressure, lb, as calculated from hydraulic pressure gauge	Beam end of test machine at center line of body bol- ster at stub end of car		At center of car		Press end of test machine at center line of body bolster at vestibule end of car		Average amount of deflection between body bolsters
		Right side	Left side	Right side	Left side	Right side	Left side	
1	132,536	.08	.10	.16	.18	.08	.10	.080
2	176,715	.10	.12	.24	.22	.12	.12	.115
3	220,894	.14	.14	.30	.28	.14	.14	.150
4	265,073	.16	.18	.34	.36	.20	.18	.170
5	309,251	.20	.22	.42	.42	.20	.22	.210
6	353,430	.22	.24	.48	.48	.24	.26	.240
7	397,609	.26	.28	.54	.54	.28	.28	.265
8	441,789	.30	.32	.60	.62	.32	.32	.295
9	485,966	.34	.36	.68	.68	.34	.36	.330
10	530,145	.36	.40	.74	.76	.38	.40	.365
11	574,323	.40	.42	.82	.82	.40	.42	.410
12	618,502	.46	.48	.92	.92	.48	.48	.445
13	662,681	.48	.52	.98	.98	.52	.52	.470
14	706,860	.54	.56	1.04	1.06	.54	.56	.500
15	751,039	.58	.60	1.10	1.14	.60	.60	.525
16	795,218	.62	.64	1.20	1.24	.64	.64	.585
17	839,396	.66	.66	1.24	1.28	.66	.66	.600

The passenger-car compression-test machine, installed at the AAR Research Center in Chicago (*Railway Age*, May 17, 1954), was used for the first time on August 17 last in testing a Union Pacific 85-ft dome-coach with aluminum-alloy superstructure, built at the St. Charles, Mo., shops of ACF Industries.

The second car, put through the test machine on November 11, 1954, was a Santa Fe 74-ft stainless-steel-sheathed baggage car, constructed at the Berwick, Pa., plant of the same builder. Both cars withstood over 800,000 lb end pressure with deflections well within AAR limits, practically no permanent set, and no signs of distress in the car structures.

How the Tests Were Made

For both tests, the cars were received at the AAR research laboratory in skeleton form, the dome-coach being loaded with 82,440 lb of sand in bags and the baggage car with 21,960 lb to compensate for missing interior trim fittings and under-car equipment. After placing each car in the test machine, longitudinal pressures applied on the center sill end at the back follower stop were recorded in pounds as calculated from a hydraulic pressure gage. Car body deflections at the center with respect to the body bolsters were measured by means of wire and mirror gages, side sheet buckles being meas-



HYDRAULIC-PRESSURE end of the test machine.



MIRROR GAGE at bolster used to check body deflection.

ured with a dial gage. Inside-width variations were carefully checked.

Test procedure for both cars was the same. The test in each case was started with a load of 132,536 lb pressure applied against the rear draft gear stop and continued in progressive steps until a total of 17 tests were made with a final load of 839,396 lb. Each test was started at zero after the load of the preceding test was released. Car body deflections over the entire load range were recorded and subsequently shown in tabular and chart form.

Dome-Coach Test Results

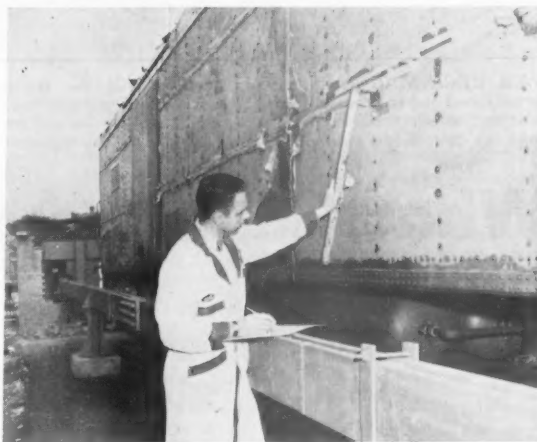
In the case of the UP aluminum dome-coach the average deflection between body bolsters on the maximum load of 839,396 lb was 0.60 in., which is well within the limit of 1.00 in. at 800,000 lb as required by the AAR specifications (page C-49-1946 of the Manual of Standard and Recommended Practices).

References to the right or left side of the car represent the view as seen facing the car from the press end of the test machine. The vestibule or *B* end of the car was at the press end of the machine during the test.

Observations were made under, outside and inside the car during the progress of the test. No defects were found under the car on the center sill or draft gear stops either during the test or on examination of these parts after the test was completed. Buckling of side sheets, which ranged from $\frac{3}{8}$ in. to $\frac{3}{4}$ in. in a span of 36 in. while the maximum load was applied, mostly disappeared when the load was released. No permanent set of any consequence developed during the test.

On the basis of results observed, the official report states that this car satisfactorily meets AAR test requirements for buffing strength.

Compression tests of the Santa Fe baggage car showed



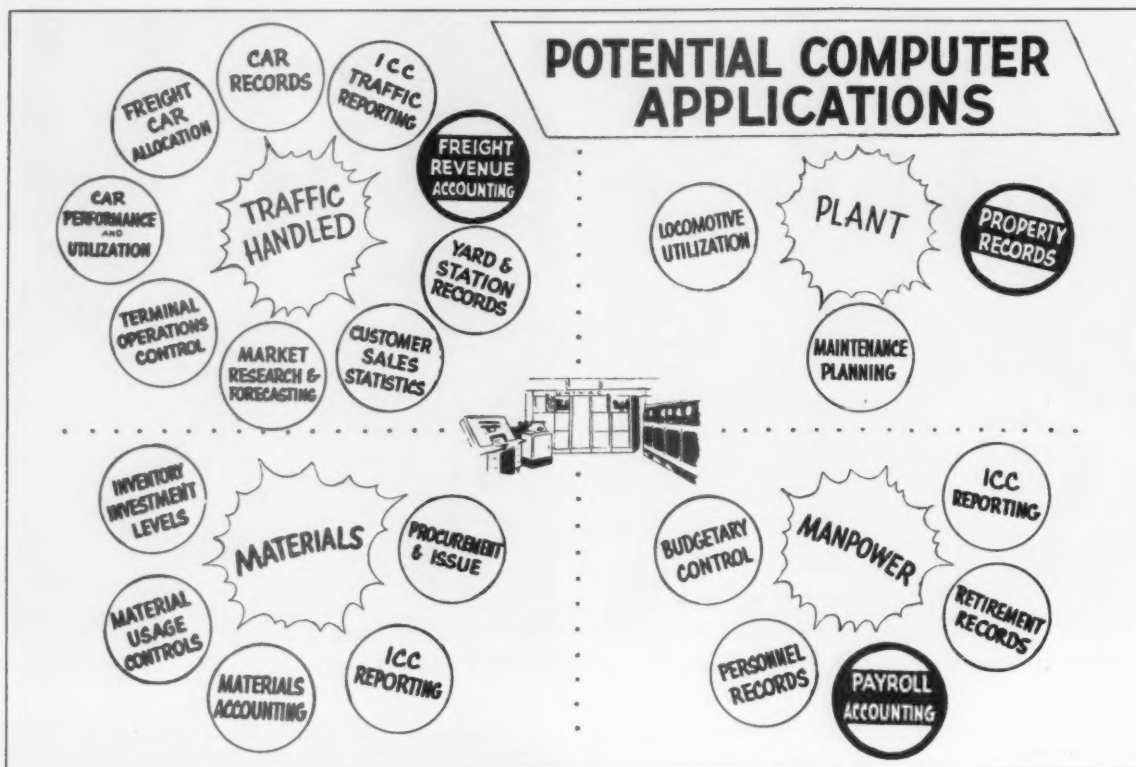
DIAL INDICATOR for measuring side sheet buckle.

an average deflection between body bolsters of 0.40 in. at the maximum load of 839,396 lb as compared with 0.60 for the somewhat longer dome-lounge car.

Observations made during the test showed no defects under the car or on the center sill or draft gear stops. Buckling of the side sheets ranged from $\frac{7}{32}$ in. to $\frac{3}{8}$ in. in a span of 36 in. while the maximum load was applied and mostly disappeared when the load was released.

A slight buckling was noted inside the car during maximum load with slight permanent deformation when load was released. There were no appreciable permanent deformations on either the interior or the exterior of the car.

The test report showed that this car also has adequate buffing strength to meet the AAR test requirements.



"OUR BEGINNING computer applications will be freight revenue accounting, property records and payroll accounting. These will be our starting points in three of the four large information systems" in which "different people in different departments at separate locations are processing almost identical data to obtain different products."—J. F. Feagler, C&O.

What Gains from Computers?...

- Better control of operations
- Reduced cost of paperwork
- More ability to meet competition

The electronic computer will spectacularly cut costs of data processing. However, the improved management controls made possible by the timely, digested information the computer turns out will be far more important to businesses than the clerical cost savings.

On these points Don G. Mitchell, president and board chairman of Sylvania Electric Products, Inc., and T. H. Bradshaw, partner in the management consulting firm of Cresap, McCormick and Paget, agreed. More than 1,200 executives, including a number of railroad men, heard these statements at a special conference of the American Management Association in New York, February 28, March 1 and 2, on the subject, "A practical approach to electronics." Approval of the Mitchell-Bradshaw viewpoint was voiced by a panel of Chesapeake & Ohio officers who told the conference of the benefits the railroad expected to gain through use of a computer, the Remington Rand Univac.

Sylvania plans soon to put a Univac system to work. Mr. Mitchell said that getting better data together will

make it impossible for management to "dodge" its responsibility for making decisions. Presently, an executive sometimes dodges by asking for more information. The quality of the information furnished by the computer system should be such that there will be little left to ask for, Mr. Mitchell said. Thus the men who can't make decisions will be uncovered and, of course, replaced.

At the same time, Mr. Mitchell continued, "early bird" users of electronic equipment will have acquired a club with which to beat their competitors. Being two or three years ahead of one's competitors is extremely important these days, he said. Furthermore, the computer, in his opinion, will make possible more decentralization of authority and responsibility and effective centralization of control. A computer cannot make decisions for local managements. But control figures, emanating from a central source, will enable local managers to make effective, intelligent decisions.

Mr. Bradshaw, speaking of the cost cutting benefits of computers, said: "For full realization of the potential of electronic equipment, there must be . . . a merger of the central data processing concept of organization and the integrated data processing concept."

As C&O officers made their presentations to the AMA conference it became obvious that they agree with Mr.

Bradshaw. The C&O aim is to have only one manual transcription of data, and a communications network which will get these data into the computer, where they will be processed at fantastically high speeds. And since the same data presently are transcribed manually many times in several different departments, writing these data only once and having the computer process them for all departments involved satisfies the concepts mentioned by Mr. Bradshaw. Wedding of these concepts, said John E. Kusiak, vice-president—finance, C&O, is bringing about a new philosophy of interdepartmental cooperation in business.

"One Shot Process"

J. F. Feagler, chief methods research officer of the C&O, described the C&O's concept of integrating the handling of paperwork by computer as "a one shot process." In making its computer study, the C&O became interested in the area of freight car movement, and the paperwork connected with it, Mr. Feagler said. "Our interest in the freight car movement area increased when we recognized that different groups of people, in several different departments and at separate geographic locations, were processing almost identical data to obtain different products. It became clear that our existing information processing was directly related to the geography of the railroad and the inherent decentralized character of the physical operations."

Under the new system involving the computer "clerical personnel concentrate on correctly recording data and events just once in a language and form which both human beings and machines can understand. The language and the form must also permit rapid electromechanical communication because of our geographical decentralization. . . . Information would be transported in machine language to an electronic computer for processing, producing a series of outputs and byproducts."

William Bamert, assistant to vice-president—finance, gave a specific example of this use of the same data in several C&O departments. One of a railroad's sales problems, he said, is to keep from being "short-hauled." This is almost impossible today, he went on, but the computer will help to change this. "Specifically, the tapes we are creating for our freight revenue accounting computer applications must contain the actual routings of shipments. . . . In the process of doing the revenue accounting . . . we must refer to master routing data in order to establish the division of revenues between participating carriers. This is a convenient point at which to determine whether the actual routing was the right one from our long-haul point of view. . . . The sooner sales effort is applied to these [and other] unfavorable diversions of traffic, the more effective will be the results." This, Mr. Bamert said, is only one of the management controls which the computer will make possible.

A. F. Dell Isola, research assistant in the C&O finance department, said that the C&O had evaluated cost cutting benefits of the computer in approximate terms. "We are convinced that many studies which purport to carry financial conclusions down to the second decimal place represent a delusion," he stated. The C&O studied as possible jobs on which to put the computer areas in which mechanization by punch cards already had been achieved. Savings from having the computer do the

road's freight revenue accounting, payroll work and property accounting are expected to amount to a net of about \$600,000 per year over what was gained by mechanization.

Mr. Dell Isola said that the C&O management reasoned as follows when making its studies of the savings possible with a computer: "If applying a computer to the accounting area makes sense economically, delay in arriving at the conclusion will cost us money. Even an approximate study ought to be good enough to tell us whether or not there is an economic payoff. On the other hand, if application of a computer to accounting is not sufficient for payoff, an approximate study again should give us a feel of this situation. It should be only in the borderline cases where there are some real doubts as to the side on which the decision would fall that a really detailed study ought to be made. Our quick study should be enough to tell us whether or not we were dealing with such a borderline case."

E. L. Morrison, Jr., superintendent of freight transportation—system, described the communications network of the C&O necessary to feed data to the computer from many locations. The system completed, he said, would cost the railroad about \$250,000 per year. The communications network and the computer will combine to make possible more "sophisticated" operational control reports, Mr. Morrison stated. He described the C&O's use of Teletype and the punched paper tape as a means of transmitting advance consists of freight trains to the next terminal at which the train is to be handled.

Computers in Other Industries

Users of computers in other industries also took part in the AMA program. H. F. Hatch, associate controller of John Hancock Mutual Life Insurance Company, Boston, said that use of International Business Machines Type 650 magnetic drum calculator in mortgage loan accounting had cut by 75% the time required to do this work.

L. L. van Oosten, methods research director of Allstate Insurance Company, Skokie, Ill., said that his company had purchased a "medium sized computer," the Datatron (Electrodata Corporation, Pasadena, Cal.), which it is using to good advantage. Through the use of the computer, he said, management receives more current control information. Furthermore, the cost of amortizing the computer over a five-year period will be more than met by the saving in clerical expense effort and the reduction in the amount of rented tabulating equipment used.

The National Tube Division of the United States Steel Corporation recently began handling its 27,000-man payroll with a Univac system. L. C. Simmons, comptroller of National Tube, said his experience was that "items not susceptible to mechanization on punch card machines may turn out to be simply byproducts of a computer run." As specific illustrations of these byproducts of computer runs, Mr. Simmons mentioned:

"1. Automatic determination of vacation and holiday eligibility and the calculation of vacation or holiday pay. In both these instances the employee's earnings are based on his average earnings during a reference period.

"2. Analyses of exceptions such as absenteeism, tardiness, overtime, etc."

Addresses and reports presented at convention last week forecast far-reaching changes in technology of construction and maintenance



G. M. O'Rourke
President-Elect



W. J. Hedley
Vice-President

THEME OF AREA MEETING . . .

Faster Tempo for Engineers

The future business life of the railway engineering and maintenance-of-way officer won't be easy, but neither will it be dull. On the one hand, he may find the need for economy and efficiency as great or greater than today, but on the other he doubtless will discover that technological progress, sparked by research and taking place at a rapid rate, will provide him with the necessary tools for solving his problems.

That's a boiled-down version of a theme that could be found running through practically all of the major or non-technical addresses last week at the fifty-fourth annual convention of the American Railway Engineering Association at Chicago. Anyone listening to the committee reports and technical addresses (summarized in a subsequent article in this issue) was bound to be impressed by the way investigation, experience and research are producing a stream of technological improvements, and to be convinced that the flow will grow as time passes.

A Look Ahead to 1975

Speaking on the subject "Railroading—A Challenge to Engineers," R. G. May, vice-president, Operations and Maintenance Department, Association of American Railroads, endeavored to picture some of the things we might see if we could project our imagination into the future—"to 1975, for instance." We would find, he said, that passenger cars are lighter and faster, fully cushioned against shocks, that locomotives are lighter, with far greater horsepower in relation to weight, and that freight cars include many specialized types, with one group carrying the bulk of intercity truck-trailers by rail.

In the operating realm, we would find that "electronic signals are transmitted from the locomotive, with track receptors returning the signal to indicate the condition of track ahead and setting switches accordingly," and

that in yards "whole freight trains are rapidly classified and switched by electronic machines which combine closed-circuit television and ingenious communications devices and function on the basis of coded information."

Track will have better wear and riding qualities, track maintenance and replacement will have become fully mechanized, and large projects will be carried out "by huge machines, which in one pass dismantle the track ahead and leave behind completely reworked track, ready for high-speed service. . . .

"While many of these devices and practices may seem somewhat in the dream stage, most are not at all hard to imagine," said Mr. May. "Some are already in service, in fact. Some are in use in other industries and need only to be adapted to railroading. Still others are undergoing advanced development."

Mr. May doesn't expect this railroad of the future "to just happen." It'll be up to the engineers to meet the challenge, "constantly improving facilities and equipment and organization to make it happen." He is certain that the railroads, "if granted anything like an even break by public authority to compete for traffic, will make sure it does happen."

Research Tempo at New High

Not often is a research man heard to express surprise over the rate of technological progress being made. But that's just what was said by G. M. Magee, director of engineering research, Engineering Division, AAR, in speaking about "Railroad Research Centers on New Horizons." His expression of surprise came when he was discussing results of his study of technological developments in fields of railroading other than engineering.

Mr. Magee drew a distinction between the type of research done by the railroads' Research Center and that



Ray McBrien
Vice-President-Elect



N. D. Howard
Secretary



G. W. Miller
President

performed by supply companies in the railroad field. As he put it, the role of the railroad's research organization is to determine the requirements or specifications for materials and devices, and then to encourage research on the part of supply companies to provide products that will meet these requirements.

There never has been a time when research on behalf of the railroads even approached the present tempo, he said. The railroads themselves, individually and collectively, can perform only a small portion of the research required in the interests of technological progress; they must rely on the supply companies to carry the major burden of this work, according to Mr. Magee.

The present situation is in marked contrast with that which prevailed prior to the middle Forties. During that earlier period, Mr. Magee explained, railroad supply companies were not too greatly interested in conducting research. Whatever the reason, there has been a marked change, with many supply companies spending large sums to develop new and improved products for railroad use. Mr. Magee's explanation of this increased activity is that the supply companies have become convinced that the railroads offer an expanded market for these better products.

Striking progress in the development of maintenance-of-way work equipment was noted by Mr. Magee. He expressed himself as also being amazed at the rate of progress taking place in this field. As a result, he said, there is a fine complement of such equipment now available on the market. Even so, new developments are occurring so rapidly that it is difficult to keep abreast of them.

Technological progress came in for incidental mention in an address by N. R. Crump, vice-president of the Canadian Pacific, entitled "The Railway Industry." "You have not stood still in the past," he said, "and you cannot afford to stand still now or in the future." His address consisted principally of an analysis of the competitive and economic problems of the railway industry. He made these three points:

(1) Under competition the railways can no longer afford to operate services that don't pay.

(2) The railways may have to upgrade some services in order to retain or regain profitable traffic.

(3) The railway's major advantage—one might say its sole competitive advantage—lies in its ability to handle volume traffic on high-density lines at low cost. Every effort must be made to retain and enhance this advantage.

Some Pointed Questions

In his address at the opening session of the convention, G. W. Miller, president of the association, and engineer maintenance of way of the Canadian Pacific's Eastern Region, mentioned specific problems in discussing technological progress. As to why bridges are painted so frequently he declared "surely there are synthetic resinous paints that will stick to steel for the life of the structure." Referring to the expense of maintaining joints he suggested "there might be a semiflexible material that can be used to weld the joint bars to each rail, just as two pieces of plywood are fastened together."

For years Mr. Miller has been "able to read the time at night by looking at the luminous dial" on his wrist watch, "but we on the railway still have to fill the switch lamps with coal oil once a week and replace a signal light bulb every 2,000 hours." He then inquired if "someone in the audience can devise a way of providing a unit to store up light during the day and give it off during the night, all with a fraction of expense we now incur?"

Of all the problems that must be faced, "the most difficult one is to lift ourselves out of the groove between those two rails and look around to see where we are going," declared Mr. Miller. In helping to solve the problems of the future, he stressed the importance of recruiting "more active young men into the ranks of our association and our profession."

Part of Mr. Miller's address was devoted to a discussion of the internal affairs of the association. He mentioned the concern of the association's directors about the "possible effect of pass restrictions for business purposes, including travel to committee meetings, by a few eastern railroads." "I am happy to report," he continued, "that there is no noticeable reduction in committee attendance since this was put into effect and at least one senior engineering officer has laid down the



BOARD OF DIRECTION of the American Railway Engineering Association in session at Chicago on March 14. *Seated around table, reading clockwise:* H. B. Christianson, special engineer, Milwaukee; H. R. Peterson, chief engineer, Northern Pacific; E. S. Birkenwald, engineer of bridges, Western Lines, Southern; Nancy Campbell, stenographer; Neal D. Howard, secretary; W. J. Hedley (vice-president), assistant chief engineer, Wabash; G. W. Miller (president), engineer maintenance of way, Eastern Region, Canadian Pacific; G. M. O'Rourke (vice-president), assistant engineer maintenance of way, Illinois Central; C. B. Porter, assistant chief engineer, Chesapeake & Ohio; C. G. Grove (past president), chief engineer, Western Region, Pennsylvania; E. E. Mayo, chief engineer, Southern Pacific (recently appointed vice-president, Southern

Pacific Pipe Lines, Inc.); B. R. Meyers, chief engineer, Chicago & North Western; Ray McBrian, engineer standards and research, Denver & Rio Grande Western; and C. J. Geyer (past president), retired vice-president, construction and maintenance, Chesapeake & Ohio.

Left to right, standing: Norris V. Engman, assistant to secretary; W. H. Giles, assistant chief engineer system-construction, Missouri Pacific lines; G. E. Robinson, engineer of structures, Lines West of Buffalo, New York Central system; M. H. Dick, western editor, *Railway Age*; C. H. Sandberg, assistant bridge engineer, system, Santa Fe; and A. B. Hillman (treasurer), chief engineer, Belt Railway of Chicago-Chicago & Western Indiana. Not present at the session: S. R. Hursh, chief engineer, system, Pennsylvania.

policy that AREA work must go on, and appropriate arrangements are being made to permit its members to travel on other roads."

Membership Up Again

As of February 1 this year, membership in the association stood at 3,278, a net gain of 21, according to the report of Neal D. Howard, secretary. This means that the membership has shown an increase every year since 1944, according to Mr. Howard. Two significant developments in membership occurred during the year—a larger number of new members was acquired in 1954 than 1953 (231 compared with 203), and the number of junior members in the association dropped further, from 220 in 1953 to 187 in 1954.

The first development, he said, was the result of a letter sent to chief engineering and maintenance officers requesting their cooperation in the matter of recommending men for membership. The second development, he continued, is "far from representing a desirable situation either from a standpoint of the young engineers themselves or the railroads."

Mr. Howard also stated that membership on the association's committees reached another all-time high in 1954 and that the prospect is for a further increase under two new rules adopted by the Board of Direction, "to spread further the advantages of membership among members and the railroads, while at the same time bringing to the committees increased knowledge and experience." One of the new rules, explained Mr. Howard, "increases from 60 to 70 the number of members permitted on a committee, while the second revises the

former rules respecting retired members on the committees to the effect that they no longer count against the total of 70 permitted on committees, or against the quota permitted on a committee from any railroad or other organization."

All sessions of the convention were directed by President Miller assisted by Secretary Howard and Vice-president G. M. O'Rourke, assistant engineer maintenance of way, Illinois Central, Chicago. The attendance at the convention included 1300 members and 1075 guests, a total of 2375.

Election of Officers

The following officers were elected: President, Mr. O'Rourke, and vice-president to serve for two years, Ray McBrian, engineer of standards and research, Denver & Rio Grande Western, Denver.

The directors elected are E. J. Brown, chief engineer, Burlington lines, Chicago; F. R. Woolford, chief engineer, Western Pacific, San Francisco; R. H. Beeder, assistant chief engineer, system, Santa Fe, Chicago; and C. J. Code, assistant chief engineer-engineer of tests, Pennsylvania, Philadelphia. Members of the Nominating Committee are: A. B. Hillman, chief engineer, Belt Railway of Chicago-Chicago & Western Indiana, Chicago; R. R. Manion, chief engineer, Great Northern, St. Paul; J. M. Trissal, assistant chief engineer, Illinois Central, Chicago; E. L. Anderson, chief engineer, Frisco, Springfield, Mo.; and L. H. Laffoley, engineer of buildings, Canadian Pacific, Montreal. W. J. Hedley, assistant chief engineer, Wabash, St. Louis, was automatically advanced to senior vice-president, succeeding Mr. O'Rourke.

HIGHLIGHTS OF A YEAR'S WORK . . .

The AREA Technical Sessions

Outlining briefly the more significant features of the committee reports and addresses presented during last week's meeting

- What effect does the weight of rail have on the cost of tie maintenance?
- Are present allowances for the superelevation of curves adequate?
- How was one railroad able to reduce materially the amount of section labor without sacrificing its standard of maintenance?
- What are the relative merits of bolted and riveted structural joints?
- What problems have air-conditioning and the internal-combustion engine introduced into the treatment of cooling water?

These and many other questions were discussed at length during the three-day convention last week of the American Railway Engineering Association.

When the fifty-fourth annual meeting closed about noon on March 17, twenty-two standing committees and one special committee had presented reports to the members. Altogether there were 141 individual reports which covered 115 of the 173 committee assignments. Thirty-six of the reports contained material recommended for adoption and inclusion in the association's Manual of Recommended Practice. Also presented during the technical sessions were a number of addresses dealing with matters pertaining to track, bridges, buildings, fuel, water service and sanitation facilities, accounting, and personnel procurement.

A preview of the work of the various committees was distributed to members in advance of the meeting in the association's bulletins. These bulletins, numbered from 516 to 521 inclusive, embraced 990 pages and included numerous drawings, photographs and tables.

Stabilizing Roadbed

Soil Engineering. Reporting on four line-construction projects the Committee on Roadway and Ballast focused attention on the effect of soil engineering on the maintenance of embankments. On one project, involving moisture and compaction control but not soil engineering, excess maintenance amounted to some \$256,000 in a six-year period. In contrast was another project on the same railroad on which a complete soil survey was made. On this project the maintenance was reported to be less than 10 per cent in excess of that required on adjacent trackage. This striking comparison indicates to the committee that if present performance continues, the

additional cost of soil engineering will be repaid many fold.

In an address supplementing the report of the committee, J. E. Griffith, assistant chief engineer maintenance of way and structures, Southern, described the methods which his road has used for stabilizing roadbed by injecting sand into impervious and unstable clay.

Basically, this form of stabilization is achieved either by placing sand piles in the roadbed or by creating a chain of sand "bulbs" through the bottom of the unstabilized section to afford a drainage outlet similar to that provided by a French drain. With the help of slides Mr. Griffith described the various methods used in constructing the sand piles and bulbs.

Progress in Weed Control

Control of roadbed and right-of-way vegetation requires the continuous attention of trained personnel and generally more money than is now allocated for this purpose, according to a report of the Roadway and Ballast committee. There is no indication that vegetation can be completely or permanently eradicated, even with the most expensive treatments.

Railroads using the more effective treatments persistently with proper attention to timing and other factors are obtaining satisfactory results at costs which average about \$50 per mile per year and which do not exceed \$100 under the most adverse conditions. The key to these results has been uninterrupted attention and treatment. Postponement of weed-control maintenance permits the build-up of weed seeds and the invasion of hard-to-eradicate perennials.

Consideration must be given to choosing the correct chemical tool for the job. As an example, an area infested with perennial grasses requires different treatment than one covered with annual or deep-rooted perennial weeds. Another factor is proper application. A common error is to reduce the rate of application. It would be better to skip the areas of least growth and concentrate on the troublesome sections.

A new grass killing chemical, Dalapon, was used commercially last year with promising results. Formulas containing a small amount of arsenic were also used as contact killers with good results.

The five-year average of tie renewals per mile of track has decreased every year since 1946 when it was 134 ties per mile (22.4 years average life) to 1953 when it was 90 ties per mile (over 33 years average life), according to statistics presented by the Committee on Ties. Thus, in a seven-year period, the indicated service life has increased 50 per cent. Not so the cost of ties, which

increased an average \$4 per mile between 1952 and 1953 to a total of \$300. This increase, amounting to an average of 11 cents per tie (3.4 per cent), was felt in all regions of the United States except New England.

Creosote for Adzed Surfaces. The Committee on Wood Preservation reported on methods used in treating the adzed surfaces of ties in connection with rail-relaying operations. "Creosote covered by AWP A P7-54 could well be used under most conditions, and also under adverse conditions," said the committee, "if an economical method of heating these oils just prior to application could be found. . . . Creosote-coal tar solutions seem to be faced with the same problems in low-temperature areas. A continuation of this thinking is the use of pastes consisting of coal tar pitch and P7-54 creosote, which are felt to assist in waterproofing holes and preventing further mechanical damage. Solutions of pentachlorophenol or of copper naphthenate in various petroleum oils have been entirely satisfactory."

Reports of a series of incising tests carried out on the Erie and Nickel Plate indicate that incised ties were less subject to splits and checks.

Hold Down Fastenings and Tie Pads. The Track committee reported on a continuing test, begun in 1947, which was designed to determine the effectiveness and economy of several types of hold-down fastenings, tie pads, etc., for increasing the service life of ties by minimizing plate cutting and thereby reducing the frequency of regaging and readzing on curves. It was noted that coated tie pads provide more effective protection of the under-plate area than uncoated pads. The service tests have not been of sufficient duration to determine the ultimate economy of tie pads and hold-down fastenings. The committee did, however, report the service records and performance of pads for periods of two to seven years and listed these pads in the report.

Much Said About Rail

Continuing a study on the economic value of the various sizes of rail, the Rail committee reported on test sections on the Illinois Central. These sections, consisting of 112-lb and 131-lb track, have been in service for 10 years. During this period there has been a saving of 6.5 per cent in the investment cost, based on an anticipated life of 15 years for the 112-lb rail and 25 years for the 131-lb, and 13.4 per cent in the maintenance cost, or a net total of 10.4 per cent in favor of the 131-lb rail.

Maintenance savings were broken down to show net savings of 19.8 per cent in man-hours, 56.9 per cent in ties, and 23.3 per cent in (stone) ballast. It was said that 8 track-miles of the 112-lb rail were removed because of bolt-hole cracks where joint packing had been installed, and 4 miles had been removed because of damage by engine burns. Thus, only 8.4 miles of the 112-lb track are left in service. All of the 131-lb rail is still in track.

Rail Performance. The Rail committee's report on rail failure statistics again shows a reduction in the number of transverse-fissure service failures. These decreased from 1,320 in 1952 to 1,207 in 1953, a net reduction of 8 per cent. The reduction in service failures is indicative of the effect of control-cooled rail and previous testing in reducing service failures. The detector-car mileage

Our Candid Cameraman Visits



From the Western Maryland—S. W. George, chief draftsman; C. L. Robinson, office engineer; F. L. Etchison, chief engineer; E. D. Billmeyer, division engineer.



Joe Giles, railroad representative, Caterpillar Tractor Company; J. W. Risk, superintendent work equipment, Canadian National.

reported by 59 roads decreased from 227,637 track-miles in 1952 to 212,281 track-miles in 1953. A considerable decrease occurred in the number of detected defects (18 per cent). This was partially due to the reduction in detector-car testing (6 per cent), but was also indicative of the benefit of control-cooled rail.

Failures for the first five years of service of rail rolled in all mills collectively shows that the failure rate has declined steadily and substantially. That for the 1948 rollings is at the lowest level reported so far. The total tonnage of control-cooled rail reported from 1935 to date is equal to 94,579 track miles. Assuming that most of this rail is still in main track, it is apparent that about 40 per cent of such track is now laid with control-cooled rail.

The accumulated failure rate of all rollings of control-cooled rail from 1943 to date is interesting in comparing the failure rate with the years of service. This rate is low for the first 5 years, is about 10 times as great for the next 4 years and then drops back to a low rate in the tenth year. Whether this is a normal characteristic or due to variations in traffic conditions or mill quality will be determined within the next several years, according to the Rail committee.

In connection with the types of failures reported in control-cooled rail, web failures within the joint-bar limits and detail fractures are outstanding. They represent 37 and 35 per cent respectively, of all failures reported. It is believed that strengthening of the upper web

the NRAA Exhibit



B. J. Richards, chief chemist of the Southern Railway; and W. W. Barger, chief inspector, Atchison, Topeka & Santa Fe.



Troy West, engineer track; B. R. Gould, gen. mgr.; F. R. Smith, chief engr. all Union Railroad; J. B. McWilliams, pres., Railway Maintenance Corp.

and fillet area, and new bolt-hole spacing, in the new rail sections will effectively control web failures, both within and outside of the joint-bar limits. If, as indicated, the cause of web failures has been corrected by measures now taken, detail fractures from shelling will remain as the principal rail problem.

During the last 14 years, 150 rail failures from hot torn steel in control-cooled rails have been investigated at the University of Illinois. A graph has been prepared showing the number of years each rail had been in service before failure. It was suggested that this information may be of value in determining when new rails should be tested with a detector car.

Cause of Rail Shelling? Preliminary investigation by the research staff, Engineering Division, AAR, gives some indication that certain maintenance factors influence the tendency of rails to shell, according to material presented in connection with the report of the Committee on Rail. It is, however, premature to offer any conclusions at this time. Gage-corner contour design improvements made on the 115, 132, and 133-RE rail sections have assisted in preventing the onset of shelling but have not prevented its eventual occurrence. Use of heat-treated and chrome-vanadium alloy rail is effective in extending the time until gage-corner shelling occurs.

Several installations of silicon rail have recently been made. Although rolling-load tests at the University of Illinois indicate that service performance of this rail



From the Texas & New Orleans—R. A. Hostetter, gen. supt. M/W equipment & scales; L. A. Loggins, chief engineer; and C. N. Billings, asst. to chief engineer.



From the St. Louis-San Francisco—F. N. Beighley, roadway engr.; G. W. Rose, roadmaster; O. G. Strickland, asst. engr.; H. W. Smith, roadmaster; O. E. Fort, div. engr.

would not equal that obtained with heat-treated or alloy-steel, its cost is substantially less than other types and there are many locations where it might be economically justified.

Study of Stress Raisers. The Rail committee initiated an investigation of the effect of various stress raisers around bolt holes in an effort to reduce further rail failures from this source. The work was carried out at the Research Center. It was found that the stress raisers causing failures originating in the bolt holes were inherent in the rail-production process. The condition that was found to shorten fatigue life more than any other combination of defects is a combination of a brand and a burr. Drill gouges have the least effect. The investigation indicated that stress raisers have a pronounced effect on the fatigue life of rail. Several methods for prevention were given, but peening the hole with a special tool was considered the most practical.

Service Performance of 78-Ft Rail. Tests of 78-ft rail on the C&NW and Pennsylvania have not been in service long enough to bring out any outstanding differences in the rail joints or to determine the rate of wear or droop. However, it was reported that, on two stretches of one mile each on the Pennsylvania, an annual maintenance saving in labor of \$330 per mile, in favor of the 78-ft rail, had been made over a 3.5-year period.

Rail Wear on Curves. The Committee on Track de-

Our Candid Cameraman Visits the NRAA Exhibit



R. W. Bailey, acting div. engr.; H. Mayer, engr. scales & work equip.; A. G. Beatty, acting supv. scales & work equip., all C&NW; J. L. Beven, Mall Tool Co.



C. L. Flinn, rdmsr., CB&Q; F. C. Teske, asst. to ch. engr., Soo Line; W. B. Rogers, pres., Fabreeka Products Co.; L. W. Robinson, T&P; F. B. Summers, Fabreeka.



F. A. Williams, assistant supervisor work equipment, and K. W. Barbican, chief fire inspector, both from the Rock Island.



From the Chesapeake & Ohio—W. S. Aylor, inspector work equipment; C. R. Kirk, supervisor work equipment; and R. W. Patton, inspector work equipment.

scribed tests made on the Bessemer & Lake Erie to determine the cause of excessive curve wear under diesel locomotives. It was found that, although the rate of rail wear with a diesel was somewhat greater than for a heavily loaded car, the greater amount of rail wear is due to the train rather than the diesel units. It was shown that rail and flange wear on curved track can be practically eliminated by lubrication with flange oilers on the diesel unit, rail lubricators in the track, or a combination of both.

Maintenance of Frog Bolts

Results of an investigation to determine the reactive characteristics required of spring washers for the economical maintenance of adequate bolt tension in crossing and turnout frogs were reported by the Track committee. This test, now concluded after a period of five years, is the first known thorough investigation of the loss in tension in frog bolts and the causes thereof. It was concluded that the No. 1 bolt position (that nearest the flangeway intersection) in bolted-rail and manganese-insert types of crossings lost by far the greater amount of tension. It was found that the chief cause of this loss of tension was wear in the crossing assembly and the imbedding and abrasion of spring washers into the nuts and crossing braces. This was the result of the greater

shock load on the bolts. Bolt stretch and nut back-off were found to be unimportant. The maintenance of bolt tension in a test of a No. 15 turnout frog was minor when compared to that of the crossing-frog bolts.

It was judged that the most benefit would be derived if the corner braces in a crossing were heat treated. It was found that the double-coil spring washer held the tension in the No. 1 bolt twice as long as the single-coil type.

As a result of these tests, it was determined that the initial bolt tension should be 40,000 lb and that the minimum bolt tension should be 10,000 lb. The higher figure was determined as the practical limit of manual wrenching and the lower limit as that necessary to prevent an excessive amount of wear between the parts.

Maintaining Grade Crossings. V. C. Hanna, chief engineer, Terminal Railroad Association of St. Louis, in an address on the maintenance of railroad crossings at grade, which supplemented the report of the Track committee, outlined conditions which maintenance of these crossings entails. These include drainage and subgrade stabilization of the crossing foundation, ballast, timbering and the use of tie pads, fastenings, anchorage, and repairs by welding.

At the instigation of the Track committee, the Research Center conducted a field test involving the measurement, under two-way traffic, of the dynamic forces exerted by rail anchors on the ties, of rail and tie move-



G. W. Hunt, maintenance inspector, Baltimore & Ohio; Gene Turner, sales service, Kershaw Manufacturing Company; C. R. Riley, chief engineer maintenance, B&O.



R. A. Lincoln, roadmaster; Ed. Vadnais, district signal foreman; G. L. Vanselow, track supervisor; and T. F. Fox, roadmaster—all from the Chicago & North Western.

ment, and also of the resistance of ties to movement in the ballast as a result of static loads. It was developed that the resistance to movement of a tie in gravel ballast, with anchors at both rails, was on the order of 2,000 to 2,500 lb per rail. With alternate ties so anchored, the resistance per tie ranged from 1,500 to 2,000 lb per rail, and with all ties anchored the resistance ranged from 700 to 1,200 lb per rail. It was determined that the magnitude of the dynamic forces was not a function of train speed.

It was demonstrated that a tie could be moved in ballast without being moved by an anchor. This so-called "ratchet" action is the result of the friction and binding force between the rail and the tie plate, and tends to move the ties in only one direction. This results in skewed unanchored ties.

Efficient and economical utilization of the holding power of the ballast to control rail creepage cannot be achieved by bunching rail anchors beyond the capacity of the ballast in a portion of a panel of track, and failing to use the other portion. The magnitude of binding and friction forces on the unanchored tie is detrimental to track if the anchors are used in such a manner as to cause the skewing of the ties, according to the report.

Speeds on Curves. Tests carried out by the Research Center showed that the equilibrium elevation on curves is a function of the bearing points of the wheels on the rails rather than the conventional gage of track, accord-

ing to the report of the Committee on Track. This experimental information further indicated that the present recommended 3-in. unbalanced superelevation should be continued in effect for the present standard heavy-weight passenger equipment but that the newer passenger equipment, which uses large center bearings, swing hangers and roll stabilizers, can comfortably negotiate curves with more than 3-in. unbalanced elevation because of lesser car body roll.

Sight Distances at Grade Crossings. At highway-railway grade crossings, where manual or automatic protection is not provided, sight distances should be provided to allow the driver of an automobile to view railway traffic and to bring his vehicle to a stop before reaching the crossing. This point was made in a report presented by the Highway committee. A diagram, formula and tables were presented for determining the area of unobstructed vision required to permit a driver, observing an approaching train traveling at various speeds, to stop his vehicle clear of the track on level, dry concrete pavement when moving within various permissible speed limits.

Simplified Time Studies. Commenting on the need for a simplified method of recording time-study information of individual work operations, the Committee on Records and Accounts reported a new method which requires less time and expense for developing the necessary data. The committee drew attention to the fact that data obtained from conventional work reports show the number of men worked, the number of work units completed and the total time worked. This is good cost information, but it does not go far enough to determine which work operations may be causing the entire organization to produce at less than the optimum rate.

In developing a simplified and more accurate method of measuring the optimum productive rates, the committee found that the productive results of each operation could be determined most easily by relating them to a basic production unit, such as a 39-ft rail length.

Reducing Labor Costs. In carrying out its assignment to review the operations of railways that have substantially reduced the cost of labor required for maintenance-of-way work, the committee on Economics of Railway Labor selected the Chesapeake District of the Chesapeake & Ohio as an example of a reorganized system of track and roadway maintenance. Under the reorganization plan all heavy out-of-face maintenance work is performed by extra forces. The work of section forces consists principally of spotting, opening drainage facilities, policing, etc. Personnel, equipment and materials are allotted in accordance with the size and time schedule of the job. Most of the maintenance program is coordinated with out-of-face track surfacing over a seven-month period on a surfacing cycle of from 3 to 5 years. Tie renewals are performed at the time of track surfacing.

The entire maintenance program for the following year is prepared in minute detail in the early fall. This program is rigidly followed. An important factor in achieving overall economy is maximum utilization of the investment in modern maintenance machinery, supplemented by judicious use of labor for full and continuous production. Off-track transportation of forces is used wherever practicable.

In the reorganization, the number of sections was reduced 39 per cent; main-track mileage per section was

MANUAL REVISIONS

While a number of new specifications and recommendations for approved practices were submitted and recommended for adoption in the Manual this year, the number of minor revisions of Manual material continued small. This continues to reflect the thoroughness of the critical review which was given by all committees to the Manual material prior to its reprinting in 1953. A small number of new specifications and recommendations were offered for comment and criticism during the ensuing year with the thought of resubmitting them for final action by the association next year. Some of the more important specifications and recommended practices offered by the committees were as follows:

Roadway and Ballast—Observing the problems encountered in the construction of trackage across reservoir areas, the committee prepared a final report on four phases of that subject for proposal or Manual material in 1956. Phases treated were: Determination of Wave Heights; Determination of Wave Forces; Construction of Embankment and Roadbed; and Construction of Embankment Protection.

Last year the committee rewrote the present Manual material under Physical Properties of Earth Material to include additions and a specification for test boring which it resubmitted for adoption this year. Also resubmitted were the material on methods of installing culverts inside of existing culverts and three parts of a critical review of all methods for the prevention of snow drifts. This included: Part 1—Methods of Protecting Against Drifting Snow and Opening Snow Blockades; Part 2—Specifications for Wood-Slat Portable Snow Fence; and Part 3—Methods of Protection Against Drifting Sand. A tentative specification covering non-flammable substances which, if approved in 1956 will become Part B of the "Specifications for Pipe Line Crossings Under Railway Tracks," was also submitted for comment and criticism.

increased 64 per cent; and trackmen, exclusive of supervision, were reduced 46 per cent through a 56-per cent reduction in section men and an 18-per cent reduction in extra forces.

What of the Future? As a part of the report of the Committee on Economics of Railway Labor, W. W. Hay, associate professor of railway civil engineering, University of Illinois, painted a picture of problems which may face the railroads of the future and described many of the new responsibilities which will challenge the engineer. Professor Hay concluded that "he (the engineer) must meet that challenge realizing that the future begins today."

Clearance on Curves

During tests made to determine passenger comfort on curved track, it was found, that the introduction of lightweight passenger equipment, with its long-travel springs, introduced additional factors into the determination of clearances on curved track. The Committee on Clearances, through the facilities of the Research Center, found that the calculation of clearance requirements for passenger cars involves seven factors. These include width of the car; overhang at the ends and middle of the car due to curvature; superelevation; play

Rail—It was recommended that changes be made in the dimensions of the 140-16 RE joint bar to conform to information shown in the Manual for other joint bars. In addition, a 140-lb head-free joint bar was designed for alternate use on railroads desiring a head-free bar in preference to a head-contact bar, which will be submitted for later consideration. The committee also recommended that the section of the Manual on rail record forms be revised so data on the mileage of detector-car testing and the number of detected defects found could be separated as between railroad-owned and leased cars and between induction and magnetic-type cars. In addition the committee recommended a new form of annual report of rail failures covering web failures within joint-bar limits in rail of 100-lb and all heavier sections.

Track—Collaborating with the Signal Section, AAR, this committee reported the results of a comprehensive review of the plans and specifications in the Manual (Portfolio of Trackwork Plans) and recommended changes in 88 of them. In connection with the specifications for special trackwork, the committee recommended certain changes with reference to "spike holes" and "depth hardening" so these references would conform to the changes in the general plans, and it further recommended withdrawal of the plan on crossing plates and 10 plans referring to girder rail construction.

A specification for spring washers to replace the present specification, and based on the results of the crossing-frog bolt-tension tests, was reported for later consideration. The committee recommended approval of a plan for a type of rail tongs for use with a crane.

Buildings—Submitted for approval were a "Specification for 4.2-in Pitch Corrugated Asbestos-Cement Siding and Roofing Sheets and Their Application"; the minimum requirements for wind loads on buildings as recommended by the American Standards Association; a statement of recommended practice with respect to shop facilities for diesel locomotives; and three minor changes in specifications.

between wheels and rails; displacement due to swing hanger movements and lateral play and wear in the truck parts; tilting of the car body due to unequal spring deflection and play in the side bearings; and allowances for the effect of track irregularities and the dynamic behavior of equipment. The report dealt with the determination of the last three items only.

The subject was attacked by a study of the forces working on a car body when moving out of equilibrium since these forces would be no problem if equipment always operated at equilibrium speeds. It was therefore evident that, by measuring the lateral movements of a car at rest on a superelevated track, a measure could be obtained of the lateral movements of a car under dynamic conditions. It was further determined that the amount of movement would vary directly in the proportion the dynamic unbalanced elevation is to the static test elevation.

The report also outlined steps to determine the lateral displacement of the equipment with reference to the center line of the trucks. It was assumed that the lateral movement of the truck parts due to play and wear was proportional to unbalance. The committee cautioned that the results obtained from measurements are only as good as the basic information and recommended that actual field conditions be determined by checking the curvature by stringlining and by measuring the superelevation. It was also stated that, since track and equipment conditions

Wood Bridges and Trestles—This committee presented a specification for "Structural Glued Laminated Lumber."

Masonry—The committee recommended a new specification for reinforced concrete pipe, which it felt would fill a need for such a specification by providing a higher test load than is recommended by the current ASTM specifications. In order that conflict might be avoided with a similar specification presented by the Committee on Roadway and Ballast, this committee recommended withdrawal of the Manual material on test boring. It also recommended revision of material referring to concrete in sea water and concrete in alkali soils and waters in the Specifications for Concrete and Reinforced Concrete Railroad Bridges and Other Structures.

Highways—Because of the long-felt need for a guide to aid highway personnel and others in making application for highway, street and roadway easements on railroad property, this committee prepared an outline of information concerning the necessary procedures, drawings and surveys incidental to providing sufficient information to permit the railroad to review the request and draw up the easement with a minimum of correspondence and delay. This outline was presented for comments and critical review by the members and will be resubmitted as Manual material next year. Also recommended were seven minor revisions of drawings and of the chart entitled Recommended Use of Highway-Grade Crossing Signals.

Records and Accounts—The committee reported completion of a project for revising the material under the title "Graphical symbols for use on railway profiles, right-of-way and track maps." Since these recommendations are to be reviewed by the American Standards Association it was recommended that final adoption be deferred pending this review.

Water, Oil and Sanitation Services—In collaboration with the Mechanical Division, AAR, this committee presented for later consideration a statement of recom-

mended practice dealing with the design and construction of fueling facilities and water supply for diesel locomotives.

Yards and Terminals—Offered for comment and criticism with the purpose of presenting it as Manual material next year the committee submitted a specification for the manufacture and installation of four-section motor-truck scales.

Iron and Steel Structures—Taking cognizance of the widespread use of high-tensile steel bolts in structural joints in steel railway bridges, the committee submitted a revised specification on this subject based on the technical knowledge gained from a large amount of research, and practical knowledge secured from the installation of a large number of these fasteners in actual service.

Economics of Railway Location and Operation—A new schedule of classes of complete roadway and track structure under AREA recommended practice, as of 1954, was recommended by the committee to replace a similar schedule which was withdrawn from the Manual in 1953.

Contract Forms—A form of agreement covering subsurface rights to mine under railway property, and a form of lease for development of oil and gas on railway lands, were submitted for adoption as Manual material. A section on cancellation of bond was proposed for addition to the form of construction contract, and matter concerning the cathodic protection of pipe lines crossing under tracks was recommended as an addition to that subject.

Maintenance-of-Way Work Equipment—Four plans were offered covering the mounting of bolted demountable-plate insulated wheels and bushings on the two new axle sizes.

Waterproofing—Recommendations were made for changes in the sections on fabricating and requirements for acceptance in the specifications for waterproof coatings for exposed concrete surfaces.

On motions made from the convention floor, all the recommendations mentioned above were approved.

are not perfect, an allowance should be added to the calculated displacement to provide for minor track irregularities and the dynamic behavior of equipment.

Reports on Bridge Studies

Improved Structural Joints. Reporting on the use of the high-strength bolt as a substitute for rivets in the joints of steel structures, the Committee on Iron and Steel Structures commented on the rapid growth of this practice. This is evidenced by the millions of high-strength bolts now in use to fasten thousands of tons of structural steel. Attention was drawn to the fact that the American railroads, with approximately 94,000 steel bridges to maintain, including the re-driving of loose rivets, offer great potentialities for fasteners of this type.

To be completely effective, high-strength bolts must be tightened to at least the minimum prescribed bolt tension. The report describes a method whereby turns of the nut from a "finger tight" position provide a criterion of bolt tension. It was shown that about a one-half turn of the nut will develop minimum tension. It was further shown that additional tightening into the plastic range will not damage the bolt but will actually improve its performance. This is especially true if the joint is subjected to repeated loading. It was therefore suggested that these

bolts be given one full turn of the nut. They may be tightened by hand or with impact wrenches. It was also found that fast nut running is difficult to control and that one full turn in about 10 sec is a good operating speed.

Advantages of high-strength bolts were further confirmed as a result of tests on full-size structural joints at Purdue University. These tests demonstrated that, when high-strength bolts are used instead of rivets in a structural connection, the high local stresses and strains at the side of the holes due to rivet bearing will be eliminated and that this relief should raise the fatigue strength of the joint.

Prestressed Concrete Slabs. The Committee on Impact and Bridge Stresses reported that, as a result of the successful behavior of a prestressed, pretensioned, full-size, reinforced concrete bridge slab in the Denver test of concrete slabs reported last year, two additional slabs, which were manufactured at the same time, were placed in service in a CB&Q bridge. This bridge is in high-speed territory and the slabs were installed for field testing under actual operating conditions. This is the first installation of prestressed concrete in a bridge on an American railroad. Because of slow orders over adjacent bridges, actual tests on this structure have been postponed until the spring of 1955.

Longitudinal Forces. This committee also reported

AREA COMMITTEE CHAIRMEN

* Indicates that vice-chairman has assumed the chairmanship.

The 22 standing committees and the one special committee represent the backbone of the AREA. Directly following the close of the convention, seven of the committee chairmen, having completed the regular three-year term of office, relinquished their duties. In each instance, the chairmanship of the committee was assumed by the vice-chairman. The committees, together with their chairmen and vice-chairmen, are as follows:

Roadway and Ballast—B. H. Crosland (chairman), assistant chief engineer, St. Louis-San Francisco. Springfield, Mo.; J. A. Noble (vice-chairman), chief engineer, Santa Fe, Amarillo, Tex.

Ties—P. D. Brentlinger* (chairman), forester, Pennsylvania, Philadelphia; L. C. Collister (vice-chairman), superintendent treating plant, Santa Fe, Albuquerque, N.M.

Rail—C. J. Code* (chairman), assistant chief engineer—engineer of tests, Pennsylvania, Philadelphia; B. R. Meyers (vice-chairman) chief engineer, C&NW, Chicago.

Track—L. L. Adams (chairman), chief engineer, LN, Louisville, Ky.; W. E. Cornell (vice-chairman),

engineer of track, Nickel Plate, Cleveland, Ohio.

Buildings—O. W. Stephens (chairman), assistant to chief engineer—maintenance, D&H, Albany, N.Y.; D. E. Perrine (vice-chairman), assistant chief engineer, Chicago & Western Indiana, Chicago.

Wood Bridges and Trestles—W. C. Howe (chairman), engineer of bridges and buildings, Bessemer & Lake Erie, Greenville, Pa.; S. L. Goldberg, Sr. (vice-chairman), structural engineer, NP, St. Paul, Minn.

Masonry—W. R. Wilson* (chairman), assistant engineer, Santa Fe, Chicago; M. S. Norris (vice-chairman), regional engineer, B&O, Pittsburgh, Pa.

Highways—W. C. Pinschmidt (chairman), engineering assistant to vice-president, construction and maintenance, C&O, Richmond, Va.; C. I. Hartsell (vice-chairman), division engineer, C&O, Saginaw, Mich.

Records and Accounts—H. N. Halper (chairman), valuation engineer, Erie, Cleveland, Ohio; L. W. Howard (vice-chairman), assistant land and tax commissioner, Chicago & Western Indiana, Chicago.

Water, Oil and Sanitation Services—H. L. McMullin (chairman), engineer of tests and water supply, T&P, Dallas, Tex.; H. M. Schudlich (vice-

on the results of tests made on a Nickel Plate bridge to determine the stresses due to longitudinal forces. This bridge consisted of five spans of open-deck beam construction supported on Armco spiral-welded pipe piles filled with concrete and topped with a concrete bridge seat. These tests furnished the first opportunity to analyze the effect of railroad loading on this relatively new and economical type of structure. It was found that the stresses from the longitudinal forces were being taken by the rails to the roadbed behind the abutments.

Supplementing the report on the Nickel Plate bridge, the Committee on Impact and Bridge Stresses sponsored an address by R. T. Blewitt, bridge engineer of that railroad. Mr. Blewitt outlined the thinking behind the selection of this type of structure and the economics of its installation, and gave details of the design and construction.

Fireproofing Wood Bridges and Trestles. Commenting on the effect of fires on bridge structures, the Committee on Wood Bridges and Trestles said that one large railroad estimates that delays caused by interruption of main-line traffic would cost from \$500 to \$750 per minute. The committee went on to describe tests of some 40 fire-retardant materials and said that several potentially useful compositions have been discovered and subjected to additional weathering tests. Because of the scarcity of useful materials, efforts have been made to publicize the problem and bring the market potential to the attention of the chemical and paint industries.

Cooling Water Treatment

The Committee on Water, Oil and Sanitation Services reported that the increased use of air conditioning and internal combustion engines on the railroads had intro-

duced new problems in cooling-water treatment. This report detailed the three general types of cooling systems used in industry, the four types of scale formations encountered in the use of water, the use of the Langelier index for predicting the tendency of water to deposit calcium carbonate and scale and the methods, both internal and external, for the treatment of water to prevent scale formation. The report also described four types of corrosion formation, and six ways in which an inhibitor functions to combat corrosion attacks.

Among new developments in water conditioning for diesel locomotive cooling systems this committee said that the borate-nitrite types of inhibitors were now being used on approximately half of the railroads. Results have been widely divergent and have varied from excellent to completely unsatisfactory. These borate-nitrite inhibitors have nearly always been proprietary compounds. They are less effective at reduced concentration than the alkaline-chromates. The concentration for satisfactory inhibition is nearly double that of the chromates. They have limited solubility. It appears that adoption of the borate-nitrite types has been due to suspected skin irritations of employees handling the alkaline-chromates rather than to their ineffectiveness as corrosion inhibitors. No complaints of skin irritation with borate-nitrite type inhibitors have been received.

Piggy Back Gets Attention

The Committee on Economics of Railway Location and Operation presented a brief history of the development of "trailer-on-flat-car" service which included figures showing the ground lost to motor carriers and the factors which affected this trend. The report outlined the service of each road now engaged in the practice. It included a

chairman), engr. water service, NP, St. Paul, Minn.

Yards and Terminals—J. N. Todd (chairman), superintendent of scales and work equipment, Southern, Washington, D. C.; F. A. Hess (vice-chairman), district engineer, NYC, Indianapolis, Ind.

Iron and Steel Structures—J. F. Marsh (chairman), engineer of bridges, Rock Island, Chicago; A. R. Harris (vice-chairman), engineer of bridges, C&NW, Chicago.

Economics of Railway Location and Operation—H. B. Christianson, Jr. (chairman), division engineer, Rock Island, Des Moines, Iowa; R. L. Milner (vice-chairman), staff engineer, C&O, Huntington, W. Va.

Wood Preservation—A. J. Loom (chairman), general superintendent timber preservation, NP, Brainerd, Minn.; W. C. Reichow (vice-chairman), engineer wood preservation, GN, St. Paul, Minn.

Contract Forms—G. W. Patterson* (chairman), assistant chief engineer, Pennsylvania, Pittsburgh, Pa.; W. D. Kirkpatrick (vice-chairman), assistant to chief engineer system, MP, St. Louis, Mo.

Economics of Railway Labor—R. J. Gammie* (chairman), chief engineer, T&P, Dallas, Tex.; D. E. Rudisill (vice-chairman), chief engineer maintenance of way, Western Region, Pennsylvania, Chicago.

Cooperative Relations with Universities—R. J. Stone (chairman), vice president operations, St. Louis-

San Francisco, St. Louis, Mo.; W. H. Huffman (vice-chairman), assistant engineer of maintenance, C&NW, Chicago.

Waterways and Harbors—Arthur Anderson* (chairman), special assistant engineer, NYC, Chicago; A. L. Sams (vice-chairman), office engineer, IC, Chicago.

Maintenance of Way Work Equipment—N. W. Hutchison (chairman), engineer of work equipment, C&O, Barboursville, W. Va.; A. W. Munt (vice-chairman), supervisor of work equipment, Canadian Pacific, Toronto, Ont.

Clearances—A. M. Weston (chairman), senior assistant engineer, B&O, Baltimore, Md.; E. R. Word (vice-chairman), special engineer, IC, Chicago.

Waterproofing—T. M. von Sprecken* (chairman), assistant to chief engineer, Southern, Washington, D.C.; Henry Seitz (vice-chairman), designing engineer of bridges and buildings, B&O, Baltimore, Md.

Impact and Bridge Stresses—E. S. Birkenwald (chairman), engineer of bridges, Southern, Cincinnati, Ohio; M. J. Plumb (vice-chairman), assistant engineer, NYC, Chicago.

Special Committee on Continuous Welded Rail—L. F. Racine (chairman), chief engineer, Monon, Lafayette, Ind.; C. E. Weller (vice-chairman), division engineer, IC, Jackson, Tenn.

description of facilities and equipment and methods of handling trailers, together with certain of the limitations encountered, along with a summary of actions before the ICC and decisions up to the date of filing the report.

The Committee on Yards and Terminals further expanded this subject by describing the three general methods of loading and unloading highway semitrailers on flat cars. This discussion was followed by general remarks covering the location of facilities, storage space required for the trailers, location of parking and storage areas, lighting, space requirements, communication systems, scales, etc.

Roller-Bearing Cars. In an address sponsored by the Committee on Yards and Terminals, on the handling of roller-bearing cars by gravity, A. V. Dasburg, transportation research engineer of General Railway Signal Company, discussed the results of tests made at the ore-loading and stockpiling facility of the Iron Ore Company of Canada at Seven Islands, Que. His conclusion was that roller-bearing cars present no greater problem in gravity yards than the best solid-bearing cars. He further stated that both types of cars must be considered when planning yard grades if optimum performance is to be achieved.

Developments in Work Equipment. One of the important functions of the Committee on Maintenance of Way Work Equipment is to report on the new developments in equipment available for use in the field. This year the committee prepared reports on 13 new machines, including a crib reducer, a bonding drill, an earth auger, a slot grinder, a hydraulic track jack, a jack carrier, a spike puller, a tie brush, two track liners, a weed sprayer, a safety crank and a vibratory tamper.

The committee advanced two reasons (economy and the development of the tamping machine) for an increased demand for tie-renewal machinery.

Maintenance of Highway Vehicles. Continuing its studies on this subject, the Committee on Maintenance of Way Work Equipment developed a suggested program for the preventive maintenance of automotive vehicles.

The primary purpose of the Committee on Cooperative Relations with Universities is to develop ways and means of attracting young engineers into the railway field. This year the committee gave a detailed report of its activities on the campuses of the various universities and colleges aimed at the achievement of this purpose. It reported that it had developed a brochure, intended for distribution among college undergraduates, which is designed to stimulate interest in the opportunities afforded by a railway engineering career.

The committee also reviewed and reported on a paper entitled "How to Attract and Hold Engineering Talent," prepared by the Professional Engineers Conference Board for Industry. The report reflects the experience of a large number of companies and individual engineers employed in industry.

Briefly, the solution of the problem of attracting engineering talent and holding it lies not only within the industry but must be sought in the schools. Current recruiting practices are sorely in need of overhauling and the prevalent practice of running-up a young engineer's starting salary by competitive bidding, and of overselling the company, defeats its own ends, according to the paper. A separation of personnel functions as regards professional and non-professional employees seems indicated, with a greater degree of recognition for the engineer's professional status.

Two out of three engineers employed in industry do not want membership in labor units. That so large a percentage do favor unions points to the necessity for immediate steps on the part of industry and the professional societies, it was stated.

"Cumulative" Maintenance Costs

By H. F. BROWN

... WHERE THEIR FALLACY LIES

Many railroads are keeping the record of maintenance costs of their diesel locomotives on a "cumulative" basis. By this method unit costs are calculated and recorded for each time period (month or year) by adding the costs of the current period to the sum total of all such costs for all the previous periods since acquisition, and dividing this total by the sum of all the mileage produced all these periods. This gives a cost-per-mile figure for each period which usually rises but little from the similar figures for the periods immediately preceding. This encourages the belief that in spite of occasional large expenditures for certain types of maintenance, or other variable in such costs, the current average costs are being shown.

That such a belief is erroneous, and that such a method of presenting maintenance costs can be very misleading, may be shown by the following simple calculations and figures.

In these calculations it is assumed for the sake of simplicity and clarity that the mileage performed by the unit or group of units under consideration is constant for each time period. This assumption allows the number of time periods to be used in the calculations instead of the mileage, and is not out of line with actual operating performance. The calculated results are the same in either case.

The sum total of maintenance costs for all time periods since acquisition, up to and including the current period, when divided by the number of time periods which have elapsed will give a figure which, when divided by a constant equal to the mileage, is the "cumulative" maintenance cost for the current period. For further simplicity, let the periodic costs be represented by simple numbers which vary in value in a manner similar to what might be expected, by experience, with diesel maintenance costs.

In Fig. 1 are shown 20 such values representing costs for each period, plotted and connected by the light continuous line. The heavy continuous line represents the actual average trend of all these values. These same values, together with their cumulative sum at the end of each time period, are shown in Table 1, together with the "cumulative cost" values, which in turn are also plotted in Fig. 1, by circled points, and connected by the broken line. These points are analogous to the "cumulative" costs as now kept by many railroads. It is im-

Mr. Brown is a consulting engineer with Gibbs & Hill, Inc., New York.

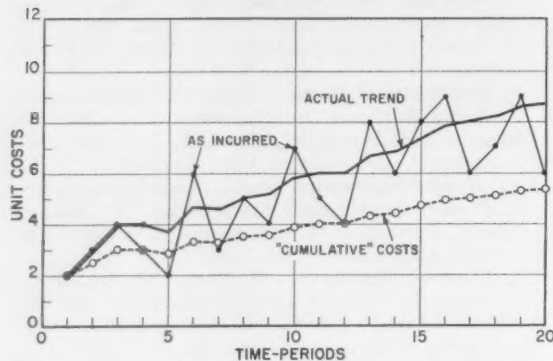


FIG. 1—Actual diesel maintenance costs are shown in the upper two curves. Cumulative costs, shown by the broken line, average in the lower costs incurred when locomotives were relatively new.

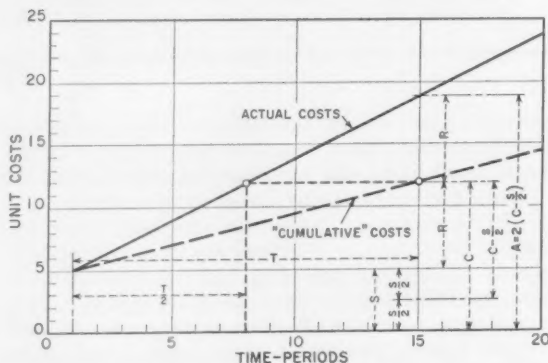


FIG. 2—Diesel maintenance costs rise constantly with the age of a locomotive. Cumulative costs show but 50 percent of the real rise above the starting point.

mediately apparent that although these points and their connecting trend line start as an average trend, they quickly wander off into an irregular line, gradually becoming smoother, but having no apparent direct bearing on the actual current cost values or actual trend line.

It may be shown that the "cumulative" method will not even show correctly uniformly rising costs. In Fig. 2 is plotted a uniformly rising trend line having a value (Continued on page 74)

TABLE 1—HOW "CUMULATIVE" COSTS RISE SLOWLY

1. Time period (months or years)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2. Cost for period	2	3	4	3	2	6	3	5	4	7	5	4	8	6	9	7	6	8	7	6
3. Accrued sum of costs	2	5	9	12	14	20	23	28	32	39	44	48	56	62	70	79	85	92	101	107
4. Cumulative cost (Line 3 ÷ Line 1)	2	2.5	3	3	2.8	3.3	3.3	3.5	3.54	3.9	4	4	4.3	4.4	4.7	4.9	5	5.1	5.3	5.35

TABLE 2—SPREAD WITH A UNIFORMLY RISING TREND

1. Time period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2. Cost for period	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
3. Accrued sum of costs	5	11	18	26	35	45	56	68	81	95	110	126	143	161	180	200	221	243	266	290
4. Cumulative cost (Line 3 ÷ Line 1)	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5

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Operations

(Continued from page 13)

tially the same—protection of the life and property of our people. The military force follows an indirect course designed to repel the enemy before he reaches our shores. . . . Civil Defense must follow a direct approach. It is neither designed nor expected to make direct contact with the enemy or his agents. Its mission is to afford the public itself the maximum degree of direct protection commensurate with the exigencies involved. To be effective it must be prepared to initiate an orderly

dispersal of population in advance of enemy attack and, if caught by surprise without opportunity for dispersal, it must be ready to salvage the maximum value in human life after the enemy has struck."

Figures of the Week

Freight Car Loadings

Loadings of revenue freight in the week ended March 12 totaled 666,548 cars, the Association of American Rail-

roads announced on March 17. This was an increase of 7,573 cars, or 1.1%, compared with the previous week; an increase of 56,611 cars, or 9.3%, compared with the corresponding week last year; and a decrease of 33,635 cars, or 4.8%, compared with the equivalent 1953 week.

Loadings of revenue freight for the week ended March 5 totaled 658,975 cars; the summary for that week, compiled by the Car Service Division, AAR, follows:

REVENUE FREIGHT CAR LOADINGS			
For the week ended Saturday, March 5			
District	1955	1954	1953
Eastern	114,853	103,902	127,434
Allegheny	126,942	111,480	142,328
Poconantus	47,454	37,219	45,888
Southern	126,004	115,043	126,876
Northwestern ..	71,593	67,638	72,364
Central Western ..	113,960	102,498	112,744
Southwestern ..	58,169	52,796	57,230
Total Western Districts	243,722	222,932	242,338
Total All Roads	658,975	590,576	684,864
Commodities:			
Grain and grain products	43,360	40,976	41,454
Livestock	6,670	7,154	7,330
Coal	111,757	90,825	113,393
Coke	10,208	8,538	14,582
Forest products ..	42,231	38,673	42,617
Ore	16,362	14,296	19,906
Merchandise l.c.d.	65,216	64,377	71,463
Miscellaneous ..	363,171	325,737	374,119
March 5	658,975	590,576	684,864
February 26 ..	635,453	595,031	668,654
February 19 ..	655,035	618,623	689,430
February 12 ..	643,859	623,706	681,604
February 5 ..	640,735	624,385	690,613
Cumulative total 9 weeks	5,758,832	5,541,827	6,203,249

In Canada.—Carloadings for the eight-day period ended February 28 totaled 67,505 cars, compared with 67,039 cars for the previous seven-day period, according to the Dominion Bureau of Statistics.

	Revenue Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada:		
February 28, 1955	67,505	32,205
February 28, 1954	68,102	30,298
Cumulative Totals		
February 28, 1955	553,672	254,087
February 28, 1954	539,042	235,671

Competitive Transport

Gurley Criticizes Plans For Financing Highways

Criticism of plans for financing the government's 10-year, \$101-billion highway program came last week from Fred G. Gurley, president of the Santa Fe.

In a statement in his road's annual report, Mr. Gurley said the President's Advisory Committee on a National Highway Program (the Clay Committee) recommended the huge highway program but "did not evaluate the effect of an enlarged highway program upon the transportation system as a whole."

The committee did not support a weight-distance user method of financing, or deal with the important question of financing grade separation expendi-



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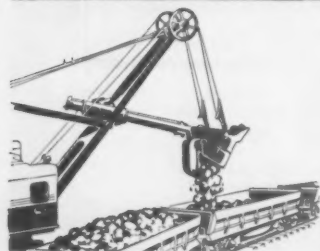
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tures where railroads and proposed highways will cross, Mr. Gurley noted.

To finance this program without provision for either new tax receipts or assessment of user charges, Mr. Gurley added, "carries the obvious import that most of the cost will fall most heavily upon individual and corporate taxpayers in the form of continuing high or higher tax rates."

Earlier, Mr. Gurley had cited handicaps in competing with other forms of transportation as a "major problem" for all railroads. He said rail carriers seek only freedom to compete on an equal basis with other transportation, with subsidy to none.

and truck rates on movements between points in Official territory. The minimum is the present railroad rate, minimum 36,000 lb, which truckers will be permitted to meet with a 28,000-lb minimum.

For truckload minima from 20,000 to 28,000 lb, the motor carrier floor will be 3 cents per 100 lb above the rail level. The decision will also permit railroads to publish a 60,000-lb minimum scale which truckers will not be permitted to meet.

In approving the latter, the commission said: "The inherent advantage of transporting canned goods by rail in Official territory is the relatively low

cost of the service, particularly on large-quantity shipments." Commissioner Freas, concurring in part, said that to permit trucks at 28,000 lb to meet the railroads' 36,000-lb rates "is not bringing about equality of opportunity."

Parity at 1/3 Minimum Weight
—In the lead case (I. & S. No. M-4384), the traffic involved moves from Chicago to Muncie, Ind. Division 2's majority, consisting of Commissioners Alldredge and Arpaia, said a truck rate no higher than the railroads' 100,000-lb rate was necessary to enable truckers to compete.

Here again, Commissioner Freas filed

Organizations

W. E. Delaney, general agent, Rock Island Lines, has been elected president of the **Rail Traffic Association** of Cincinnati; M. F. Connor, general agent, Northern Pacific, was elected vice-president; and Harry Chatron, general agent, Reading, secretary-treasurer.

Senator Richard L. Neuberger, of Oregon, will be principal speaker at the annual dinner of the **Federation for Railway Progress** in the Waldorf-Astoria, New York, March 24.

At the recent 38th annual meeting of the **Pacific Railway Club** in San Francisco, the following new officers were elected: President, T. T. Bickler, mechanical superintendent, Santa Fe, Los Angeles; vice-presidents, V. W. Smith, superintendent, Union Pacific, Los Angeles, G. S. Allen, superintendent transportation, Western Pacific, San Francisco, D. K. Miller, terminal superintendent, Union Passenger Terminal, Los Angeles, R. E. Marks, assistant to vice-president, Southern Pacific, San Francisco; treasurer, F. H. Smith, division freight agent, Santa Fe, San Francisco; secretary, S. E. Byler, supervisor of contracts, Santa Fe, Los Angeles.

Rates and Fares

ICC and Division Differ On "Inherent Advantage"

While the Interstate Commerce Commission recently undertook to recognize the railroads' "inherent advantage" in transportation of large shipments of canned goods, the commission's Division 3 found reasonable a truck rate on lead with a minimum weight of 32,000 lb which was on the same level as a railroad 100,000-lb rate.

Minimum Rate Order—In the canned-goods case (No. 31104), the commission prescribed minimum rail



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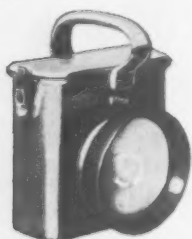
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a separate opinion, this time a dissent. The majority report, he said, "denies to rail carriers the benefit of an inherent advantage flowing from their ability to transport large quantities at low cost."

Tariff Study Group Sends Out 24th Questionnaire

The Railroads' Tariff Research Group has sent out the 24th of the series of questionnaires whereby it is seeking views of interested parties on ways and means of simplifying and otherwise improving tariffs.

Questionnaire No. 24's question is: Considering the relative advantages and disadvantages of each type, do you prefer agency or individual lines tariffs for line-haul rates?

Coal Industry Girds For Freight Rate Fight

Midwest coal producers have joined eastern operators in the movement to bring about "more equitable" freight rates on coal.

This was announced by Tom Pickett, executive vice-president of the National Coal Association. Mr. Pickett's statement was issued after a meeting of coal company executives who got together to discuss the report of President Eisenhower's Advisory Committee on Energy Supplies and Resources Policy.

The report recommended that freight rates be adjusted "to the extent necessary to remove the excessive and disproportionate contribution coal rates are making to meet the cost of other unprofitable services to the railroad industry" (*Railway Age*, March 7, page 9). The coal executives' group "unanimously approved" that recommendation, Mr. Pickett said. He added that the group would oppose any increases in rates on coal, and would object to extension of the Ex Parte 175 increases, now scheduled to expire at the end of this year.

Equipment & Supplies

FREIGHT CARS

The American Refrigerator Transit Company has ordered 100 70-ton 50-ft. and 40 40-ton 40-ft. insulated box cars from the Pacific Car & Foundry Co. Estimated unit cost of the larger cars is \$13,800; of the smaller cars, \$12,200. Delivery is scheduled for next August.

The International Railway Car Company has announced receipt of orders for 39 cabooses costing over \$500,000. The Chicago & North Western ordered 25; the Chicago Great West-

ern, 10; and the Reserve Mining Company, four.

The Missouri-Kansas-Texas has ordered 25 70-ton gondola cars from Bethlehem Steel Company for delivery in May.

The North American Car Corporation has ordered eight 70-ton covered hopper cars from the Pullman-Standard Car Manufacturing Company at an approximate unit cost of \$8,800. Delivery is scheduled for April.

The Pittsburgh & West Virginia has ordered 50 70-ton covered hopper cars from the Pullman-Standard Car Manufacturing Company at a cost of \$370,000. Delivery is scheduled for late this month.

The Baldwin-Lima-Hamilton Corporation will build 45 bottom dump hopper cars with automatic air-operated clam-shell doors for the San Manuel Copper Corporation. The cars, said to be the largest of their kind, will each have a capacity of 70 cu yd level full, or 100 tons.

The Southern has ordered 50 50-ton box cars from the Pullman-Standard Car Manufacturing Company.

The Wabash has ordered 300 50-ton 50½-ft box cars (including 50 for the subsidiary New Jersey, Indiana & Illinois), from the General American

Needed!

January 1955

Issue

Railway Freight Traffic

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J. A. Miller

Railway Age

30 Church Street

New York 7, N. Y.

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BRAND

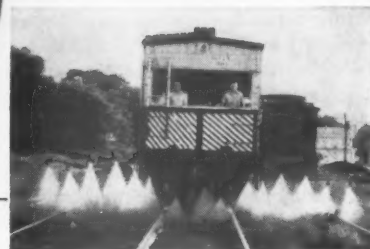
WEED KILLERS

RIGHT for the big jobs

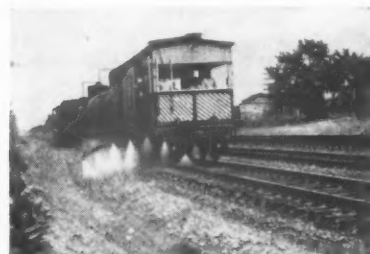


TCA-CHLORATE Liquid Concentrate in Tank Car Lots for Spray Train Application.

General Chemical's "Rite-o-way" Brand TCA-CHLORATE is made especially for large-scale railroad weed control operations. This special high-strength formulation of sodium trichloroacetate and sodium chlorate is an outstanding all-purpose weed killer used on leading railroads. General Chemical's Railroad Weed Control Service can furnish you with a complete, professionally planned control program for using "Rite-o-way" TCA-CHLORATE, including equipment and trained technical crews to do the spraying.



General Chemical's Railroad Weed Control Service provides the most advanced type of spray trains with specially designed spray heads to give complete control for all conditions.



Spray apparatus is designed to provide variable volume of output for greater kill where heavier weed growths are found.

RIGHT for the small jobs



"STA-KLOR" Spray Powder in 100-lb. Drums for Dry or

Wet Application by your regular labor crews.

For those nuisance jobs of weed killing in terminal yards, rip tracks, storage yards, station curbs and driveways, switches, ladder tracks and many more. STA-KLOR is the same powerful herbicide as "Rite-o-way" TCA-CHLORATE, a high-strength formulation of sodium trichloroacetate and sodium chlorate. A convenient spray powder—it can be used both as a dust and a spray. Handy 100-lb. drums; can be applied by your regular labor crews.



General Chemical STA-KLOR gives you these big advantages:

- Economical.
- Easy to handle . . . easy to use.
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- Kills roots, prevents re-growth.
- Does not create fire hazard . . . retards burning.

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Weed Killer Department

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.



CUMULATIVE MAINTENANCE COSTS

(Continued from page 66)

of 5 at the end of the first period and rising at the rate of 1 for each successive period. The actual values and "cumulative" values are calculated in Table 2 for 20 time periods. The upper straight line shows, by assumption, the actual incurred values. The "cumulative" values are shown by the straight line having the lower slope. It will be readily seen that the lower line conveys but little real meaning or information regarding the actual current costs. It actually shows but 50 per cent of the real rise above the starting point.

Since the keeping of maintenance cost records or trends is of value only as an index of current performance, and for the ultimate determination of the economic life of the equipment under consideration, it will be seen from these examples that "cumulative" costs can give a very misleading concept of the unit costs actually being established.

Transportation Corporation. Half the cars will have 8-ft doors, and half (including the 50 for the NJ&I), will have 12-ft double doors. Delivery is scheduled for May.

The Western Pacific contemplates purchase this year of 250 box cars (including 100 with automobile loaders), 50 flat cars (some of which will be used in piggyback service), 35 cabooses, 20 insulated box cars with Compartmentizers, and 80 other cars of types not yet determined.

IRON & STEEL

The Atlantic Coast Line has ordered 35,500 tons of rail from the Tennessee Coal & Iron division of U. S. Steel Corporation at a cost of \$3,195,000.

Supply Trade

Stockholders of the American Locomotive Company will be asked at the New York City annual meeting April 19 to change the firm's corporate name to **Alco Products, Inc.** The new name is intended to reflect expansion of the company's non-locomotive production.

The federal government's anti-trust complaint against **General Railway Signal Company**, the **Westinghouse Air Brake Company**, and the **Western Railroad Supply Company** has been settled by a consent judgment entered March 15 in the United States District Court at Buffalo, N.Y. The Department of Justice says that the judgment requires the defendants to

abandon arrangements which the complaint assailed as restraint-of-trade practices in the manufacture and sale of railroad-highway grade crossing protective devices.

Robert K. McKenzie, chief engineer of the Libertyville plant of the **Morton Manufacturing Company**, has been appointed sales engineer. He will serve as direct assistant to **Robert S. Morton**, vice-president, now in charge of the railroad division.

Thomas S. Eader III has been promoted to railroad radio sales manager for Bendix Radio, Communications Division of **Bendix Aviation Corporation**, succeeding **A. Ellis**



Thomas S. Eader III

Jones, who has been named manager of mobile and railroad radio sales. A photograph of Mr. Jones was published in *Railway Age*, February 1, 1954, page 13.

James A. King, formerly vice-president in charge of railway sales, **Morton**

The fallacy is obvious. It lies in the fact that "cumulative" costs give "average cost over the life" up to and including each period. They should, therefore, be considered as to applying to, and should be plotted at, the "average time period," or half way back to the starting point for each period.

Then, and only then, will the "cumulative" costs lie on the actual trend line.

"Cumulative" costs can be made to show current average costs if the value of the costs for the starting period are known. Simply subtract from the current "cumulative" costs one-half of the costs for the first period, and double the figure that remains. This will be a very close value of the current average costs. For example, if current "cumulative" costs indicate that a group of diesels have a maintenance cost of 26 cents per unit mile, and initially their cost was 10 cents per unit mile, subtract half of 10 cents or 5 cents from 26 cents, leaving 21 cents, and double this figure, making 42 cents. This is very closely the actual "current average" maintenance cost.

Manufacturing Company, has joined the **Transportation Products Company** as a sales representative at Chicago.

OBITUARY

Fitzwilliam Sargent, 62, vice-president, railway sales, the **Budd Company**, died March 14 as a result of burns received in a fire at his home in Philadelphia.

Securities

Security Price Averages

	March 15	Prev. Week	Last Year
Average price of 20 representative railway stocks	88.26	90.31	61.46
Average price of 20 representative railway bonds	98.90	99.19	94.36

Dividends Declared

PROVIDENCE & WORCESTER.—\$2.50, quarterly, payable April 1 to holders of record March 14.

RICHMOND, FREDERICKSBURG & POTOMAC.—voting common, 75¢, quarterly; dividend obligations, 75¢, quarterly; both payable April 1 to holders of record March 15.

ST. LOUIS SOUTHWESTERN.—\$5, payable March 28 to holders of record March 21.

SOUTHERN RAILWAY M & O STOCK TRUST.—\$2, semiannual, payable April 1 to holders of record March 15.

SPOKANE INTERNATIONAL.—increased quarterly, 30¢ payable April 1 to holders of record March 18; quarterly, 30¢, payable July 1 to holders of record June 15; quarterly, 30¢, payable October 3 to holders of record September 15; quarterly, 30¢, payable December 15 to holders of record December 1.

TEXAS & PACIFIC.—common, \$1.25, quarterly; preferred, \$1.25, quarterly; both payable March 31 to holders of record March 25.

WHEELING & LAKE ERIE.—common, \$1.43¾, quarterly, payable May 2 to holders of record April 15.

(More news on page 76)

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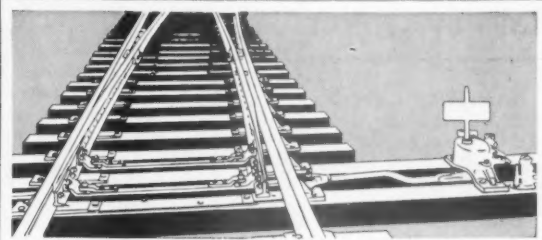
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Railway Officers

BALTIMORE & OHIO CHICAGO TERMINAL.—J. A. F. Craig, general foreman, has been appointed master mechanic at Chicago, succeeding G. W. Short, retired.

BESSEMER & LAKE ERIE.—The title of C. G. Huber has been changed from supervisor wage schedules to supervisor labor relations.

Harry R. Morris has been appointed industrial engineer at Greenville, Pa., and will report to the general

manager. S. B. Schenck, special engineer in the maintenance of equipment department, has been transferred to the office of industrial engineer.

B. E. Leech, general storekeeper at Greenville, retired February 28, after 43 years of continuous service.

CANADIAN NATIONAL TELEGRAPHS.—R. B. Steele, chief engineer at Toronto, has been promoted to general superintendent, Eastern region, at that point. H. J. Clarke, superintendent at St. John's, Nfld., has been promoted to superintendent, Western region at Winnipeg. J. H. S. Ford, general transmission and plant en-

Hales to Succeed White On Nickel Plate

Felix S. Hales, executive vice-president of the Nickel Plate since 1952, was elected president on March 16, to succeed L. L. White, who continues as chairman of the board and chief executive officer. The changes become effective April 1.

gineer at Toronto, has been named to succeed Mr. Steele as chief engineer.

KANSAS CITY SOUTHERN.—E. E. Snodgrass has been appointed assistant general freight agent at Kansas City, Mo., succeeding Guy C. Bowen, who has retired after more than 45 years of service.

NICKEL PLATE.—Edward J. Hoffman has been appointed general agent at Milwaukee, succeeding A. J. Haas, whose promotion to assistant general freight agent at Chicago was noted in *Railway Age* March 7.

NORFOLK & WESTERN.—M. E. Bowman, trainmaster of the Scioto division at Portsmouth, Ohio, has been promoted to assistant superintendent of the Pocahontas division at Bluefield, W. Va. O. E. Mullins, trainmaster of the Pocahontas division, has been named assistant superintendent of the Scioto division at Portsmouth, succeeding W. O. Tracy, who has been appointed assistant superintendent of Norfolk terminal. R. F. Dunlap, assistant trainmaster at Williamson, W. Va., succeeds Mr. Bowman as trainmaster of the Scioto division. W. S. Clement, assistant trainmaster at Portsmouth, succeeds Mr. Mullins as trainmaster of the Pocahontas division.

W. E. Robertson, Jr., assistant to superintendent transportation, has been named assistant superintendent transportation at Roanoke, Va., succeeding R. A. Littrell, who retired March 1. R. E. Sessoms, supervisor transportation, succeeds Mr. Robertson as assistant to superintendent transportation. Mr. Robertson will continue as director of civil defense for the N&W.

ROCK ISLAND.—R. C. Davidson, freight traffic manager at Chicago, retired February 28 after 51 years of service. Ralph M. Lang, assistant to general freight traffic manager, and L. J. Olsen, acting general freight agent, have been promoted to assistant freight traffic managers. J. A. Christiansen, assistant general freight agent, has been named general freight agent.

OBITUARY

G. H. Whitaker, retired traffic manager of the Macon, Dublin & Savannah, died March 10 at his home in Montgomery, Ala.

a 30-day trial will convince you that **VI-LAN CLEAN** is

a "natural" for men
who work with diesels
and in diesel shops

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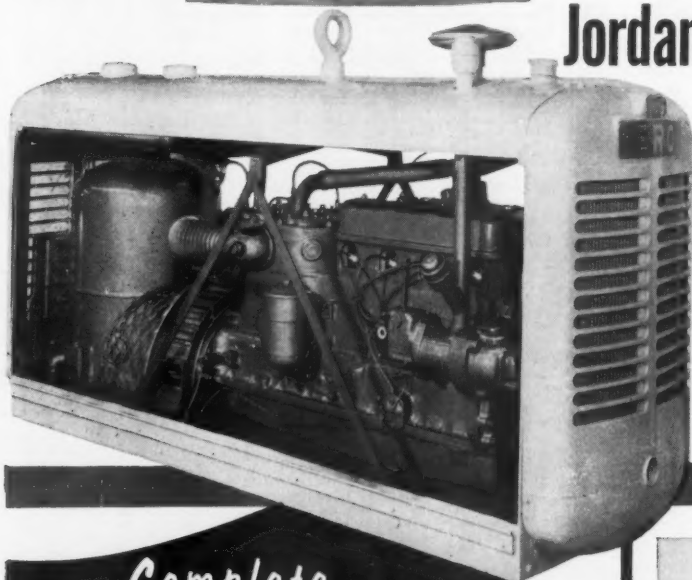
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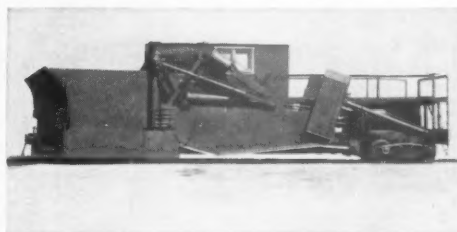
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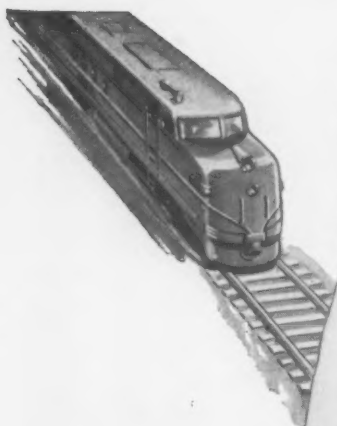
WALTER J. RILEY, CHAIRMAN OF THE BOARD
EAST CHICAGO, INDIANA

Freight Operating Statistics of Large Steam Railways—Selected Items

Region, Road and Year	Miles of road operated	Locomotive-Miles		Car-Miles		Ton-miles (thousands)		Road-locom. on line					
		Train-miles	Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross excl. locos. & tenders	Net rev. and non-rev.	Serviceable		per cent B.O.		
									Unstored	Stored			
New England Region													
Boston & Maine.....	1954	1,564	248,385	253,556	9,262	8,848	63.3	584,334	230,591	71	1	4	5.3
	1953	1,665	245,930	249,829	7,800	8,754	64.7	571,585	223,813	78	1	4	4.8
N. Y., N. H. & Hfd.....	1954	1,746	265,629	265,651	18,308	10,611	64.4	673,071	265,015	89	..	2	2.2
	1953	1,748	280,984	280,990	19,424	10,696	64.5	682,531	271,863	90	..	4	4.3
Delaware & Hudson.....	1954	792	194,228	200,140	10,811	9,144	64.2	644,459	320,454	39	2	3	6.8
	1953	793	192,263	197,598	10,651	8,827	65.8	617,233	307,284	43	..	1	2.3
Del., Lack. & Western.....	1954	962	277,502	291,638	22,199	11,932	64.5	802,161	341,644	64	..	..	..
	1953	962	260,346	274,233	18,933	10,666	64.2	713,939	298,573	64	..	..	..
Erie.....	1954	2,224	552,796	559,734	19,883	29,270	65.9	1,822,517	698,381	159	..	5	3.0
	1953	2,224	540,231	543,950	23,349	28,613	65.6	1,792,404	690,745	167	..	4	2.3
Grand Trunk Western.....	1954	952	247,963	253,776	2,097	8,127	56.9	597,917	231,043	57	6	15	19.2
	1953	952	254,767	260,957	1,869	7,978	56.8	580,529	226,889	64	5	8	10.4
Lehigh Valley.....	1954	1,142	208,621	211,993	6,351	10,180	62.9	700,654	306,015	32	1	1	2.9
	1953	1,150	217,961	221,460	6,939	9,886	63.9	656,891	277,559	30	3	1	2.9
New York Central.....	1954	10,663	2,447,777	2,482,047	96,004	95,111	57.2	6,963,827	2,910,875	578	131	99	12.3
	1953	10,667	2,469,623	2,520,317	94,055	90,510	56.1	6,748,161	2,812,598	670	69	131	15.1
New York, Chic. & St. L.....	1954	2,155	713,846	735,108	6,137	26,872	60.4	1,920,973	810,049	140	32	38	18.1
	1953	2,161	680,254	705,547	7,024	24,524	59.6	1,794,977	726,792	182	35	34	13.5
Pitts. & Lake Erie.....	1954	221	57,020	57,156	200	2,406	59.5	226,441	130,293	12	7	1	5.0
	1953	221	67,231	69,119	24	2,715	61.1	237,196	139,376	17	11	6	17.6
Wabash.....	1954	2,381	526,155	526,676	6,754	22,809	64.7	1,468,354	553,573	103	..	..	..
	1953	2,381	501,428	501,847	6,564	20,706	63.5	1,366,986	525,580	104	15	24	16.8
Baltimore & Ohio.....	1954	6,078	1,456,749	1,597,208	136,093	55,263	58.7	4,299,290	1,958,887	427	56	108	18.3
	1953	6,077	1,484,332	1,624,671	151,660	54,600	57.8	4,315,580	1,959,464	492	65	93	14.3
Bessemer & Lake Erie.....	1954	209	27,159	27,314	30	1,010	63.2	99,228	58,643	9	6	..	..
	1953	209	35,566	35,713	66	1,042	61.3	114,282	70,943	13	4	..	..
Central RR Co. of New Jersey.....	1954	613	126,149	126,902	5,143	4,901	63.7	364,879	186,327	60	2	5	7.5
	1953	614	124,670	128,666	5,514	4,581	62.3	352,365	179,969	63	3	15	18.5
Chicago & Eastern Ill.....	1954	868	136,011	136,011	2,859	5,417	61.2	366,845	197,374	27	..	6	2
	1953	868	119,503	119,503	2,537	4,481	61.8	320,613	151,047	26	..	2	7.1
Elgin, Joliet & Eastern.....	1954	236	74,925	75,096	..	2,314	66.3	189,238	100,795	33	7	3	7.0
	1953	236	89,126	89,663	14	2,649	61.4	215,681	114,682	37	3	1	2.4
Pennsylvania System.....	1954	9,890	2,666,090	2,857,949	202,079	109,707	60.9	8,011,776	3,569,123	742	237	408	29.4
	1953	9,922	2,632,431	2,817,257	231,907	101,614	59.0	7,554,895	3,310,136	861	290	330	22.3
Reading.....	1954	1,304	332,824	335,954	14,057	11,984	58.8	1,004,709	514,772	152	18	22	11.5
	1953	1,301	335,903	341,854	13,255	11,939	57.7	970,990	485,704	181	30	14	6.2
Western Maryland.....	1954	847	157,237	161,946	7,943	5,515	58.7	471,444	254,695	35	..	..	..
	1953	857	170,113	183,689	13,268	5,850	58.9	507,780	278,960	84	16	4	3.8
Poa-Ing Region													
Chesapeake & Ohio.....	1954	5,063	1,322,287	1,343,885	40,133	52,093	54.8	4,520,323	2,433,351	343	45	198	33.8
	1953	5,023	1,169,022	1,193,606	31,587	45,744	55.6	3,926,759	2,107,429	373	83	150	24.8
Norfolk & Western.....	1954	2,110	644,502	689,446	55,301	29,479	56.9	2,753,653	1,475,088	224	29	20	7.3
	1953	2,113	630,808	666,346	45,350	26,754	56.3	2,464,346	1,299,554	231	28	15	5.5
Southern Region													
Atlantic Coast Line.....	1954	5,334	819,987	819,990	8,822	24,103	52.9	1,859,300	782,546	239	..	3	1.2
	1953	5,354	778,459	778,465	9,042	23,736	54.2	1,790,281	751,891	240	..	5	2.0
Central of Georgia.....	1954	1,731	187,083	187,107	2,084	7,272	66.0	501,947	233,919	72	..	2	2.7
	1953	1,754	188,385	188,412	1,977	6,309	62.1	445,143	196,036	67	..	2	2.9
Gulf, Mobile & Ohio.....	1954	2,718	282,843	282,843	582	15,308	66.2	1,058,563	490,346	86	..	3	3.4
	1953	2,718	304,431	304,431	298	14,715	60.2	1,059,705	463,673	87	..	2	4.1
Illinois Central.....	1954	6,539	1,260,892	1,262,922	40,891	47,023	60.5	3,436,163	1,530,103	426	88	147	22.2
	1953	6,537	1,415,205	1,420,161	47,393	46,136	57.4	3,491,366	1,520,016	531	34	76	11.9
Louisville & Nashville.....	1954	4,716	903,645	909,404	17,126	31,812	59.1	2,446,875	1,200,103	242	41	11	3.7
	1953	4,728	942,348	982,358	18,732	30,495	59.9	2,310,580	1,126,014	241	41	51	15.3
Nash., Chatt. & St. Louis.....	1954	1,043	182,982	187,513	4,518	6,084	70.4	380,183	168,913	50	..	3	5.7
	1953	1,032	184,247	188,709	3,808	5,530	59.0	393,555	165,524	51	..	2	3.8
Seaboard Air Line.....	1954	4,053	626,191	626,191	1,635	24,636	59.5	1,829,255	804,433	141	..	6	4.1
	1953	4,067	620,349	620,349	2,402	23,064	58.1	1,727,139	733,028	144	..	5	3.4
Southern.....	1954	6,264	945,064	945,124	13,226	40,321	62.8	2,690,751	1,159,985	273	..	1	4
	1953	6,262	942,408	942,448	10,973	36,010	62.5	2,428,697	1,045,529	218	5	4	1.8
Northwestern Region													
Chicago & North Western.....	1954	7,848	704,076	705,342	9,629	28,629	64.7	1,933,238	873,185	147	38	42	18.5
	1953	7,850	669,896	672,125	11,063	26,968	62.0	1,863,734	836,008	180	43	85	27.6
Chicago Great Western.....	1954	1,437	136,724	136,724	239	7,523	65.4	509,109	221,497	31	..	2	6.1
	1953	1,435	134,694	134,694	230	7,398	63.4	504,730	212,462	31	..	2	6.1
Chic., Milw., St. P. & Pac.....	1954	10,633	1,003,337	1,016,143	20,218	40,801	59.9	2,861,269	1,210,846	252	54	24	7.3
	1953	10,631	1,016,886	1,033,910	31,217	39,984	61.7	2,738,374	1,162,532	351	37	44	10.2
Chic., St. P., Minn. & Omaha.....	1954	1,606	166,095	167,689	5,161	5,553	67.5	381,519	169,503	61	1	19	23.5
	1953	1,606	168,040	170,111	5,081	5,407	63.2	378,741	161,227	55	8	19	23.2
Duluth, Missabe & Iron Range.....	1954	569	29,760	29,760	100	536	54.1	43,976	21,321	24	29	12	18.5
	1953	569	37,956	38,149	370	700	54.0	55,919	35,067	28	28	27	32.5
Great Northern.....	1954	8,288	1,025,749	1,032,647	30,328	38,678	66.2	2,704,533	1,234,229	227	172	32	7.4
	1953	8,293	1,007,052	1,010,024	31,557	37,518	67.9	2,553,645	1,164,617	264	174	40	8.4
Minneapolis, St. P. & S. Ste. M.....	1954	4,171	384,469	387,301	4,780	12,197	64.9	800,661	360,450	96	..	20	17.2
	1953	4,169	377,214	378,829	4,200	10,727	67.0	681,235	304,872	104	3	14	11.6
Northern Pacific.....	1954	6,570	838,649	857,695	22,711	31,446	61.8	2,233,172	959,786	287	25		

For the Month of December 1954 Compared with December 1953

Region, Road and Year	New Eng. Region	Freight cars on line			Per Cent R.O.	G.t.m. per train-mi.		Net ton-mi. per train-mi.	Net ton-mi. per car-mi.	Net ton-mi. per car-day	Car-miles per car-day	Net ton-mi. per road-mi.	Train-miles per train-hour	Miles per loco. per day
		Home	Foreign	Total		exc. locos. and tenders	exc. locos. and tenders							
Boston & Maine.....	1954	2,864	7,200	10,064	5.5	37,352	2,358	930	26.1	722	43.8	4,756	15.9	123.8
N. Y., N. H. & Hud.....	1953	2,676	6,555	9,231	2.9	38,636	2,331	913	25.6	756	45.7	4,336	16.6	113.8
	1954	3,410	11,875	15,285	4.1	40,822	2,534	998	25.0	827	32.8	4,896	16.1	124.0
	1953	3,556	10,971	14,527	2.6	40,343	2,429	968	25.4	558	34.1	5,017	16.6	120.2
Delaware & Hudson.....	1954	7,219	3,974	11,193	5.8	62,423	3,333	1,657	35.0	956	42.5	13,052	18.8	162.3
Del., Lack. & Western.....	1953	7,548	3,913	11,461	5.7	61,533	3,227	1,606	34.8	881	38.6	12,500	19.2	165.7
	1954	8,133	10,036	18,169	3.0	51,729	2,936	1,251	28.6	634	34.3	11,456	17.9	174.6
	1953	8,916	8,175	17,091	4.0	49,081	2,785	1,165	28.0	579	32.2	10,012	17.9	162.5
Erie.....	1954	11,751	15,723	27,474	5.1	63,959	3,326	1,275	23.9	807	51.4	10,130	19.4	127.8
	1953	11,809	14,623	26,432	4.0	62,072	3,347	1,290	24.1	848	53.6	10,019	18.7	119.2
Grand Trunk Western.....	1954	4,745	8,254	12,999	5.7	51,625	2,429	938	28.4	569	35.2	7,829	21.4	112.3
	1953	4,288	6,717	11,005	4.9	48,169	2,291	896	28.4	629	38.7	7,688	21.1	116.4
Lehigh Valley.....	1954	10,014	6,523	16,537	3.9	69,003	3,381	1,477	30.1	599	31.7	8,644	20.5	220.9
	1953	8,734	7,377	16,111	4.5	63,096	3,047	1,287	28.1	551	30.7	7,786	20.9	230.2
New York Central.....	1954	72,050	78,411	150,461	8.3	49,934	2,891	1,208	30.6	611	34.9	8,806	17.6	116.0
	1953	79,969	75,238	155,207	10.1	48,480	2,777	1,158	31.1	570	32.7	8,506	17.7	109.3
New York, Chic. & St. L.....	1954	11,114	13,047	24,161	8.5	50,290	2,733	1,152	30.1	1,100	60.4	12,126	18.7	177.6
	1953	11,105	8,931	20,036	6.9	48,601	2,674	1,083	29.0	1,123	63.5	10,849	18.4	100.1
Pitts. & Lake Erie.....	1954	8,651	3,203	11,854	11.6	60,000	3,992	2,297	54.2	303	9.4	19,018	15.1	89.3
	1953	6,718	8,105	14,823	5.2	55,433	3,540	2,080	51.3	335	10.7	20,344	15.7	70.0
Wabash.....	1954	8,808	10,015	18,823	7.7	63,017	2,805	1,057	24.3	938	59.7	7,500	22.6	176.1
	1953	9,257	10,147	19,404	8.8	63,923	2,743	1,055	25.4	888	55.1	7,121	23.4	121.7
Baltimore & Ohio.....	1954	59,310	34,204	93,514	14.5	47,122	2,985	1,360	35.4	674	32.4	10,396	16.0	101.9
	1953	59,412	38,307	97,719	4.7	45,911	2,944	1,337	35.9	647	31.2	10,401	15.8	93.0
Bessemer & Lake Erie.....	1954	6,756	661	7,417	19.3	47,821	3,962	2,342	58.1	247	6.7	9,051	13.1	72.6
	1953	8,185	574	8,759	7.0	48,985	3,357	2,084	68.1	286	6.9	10,950	15.2	57.2
Central RR Co. of New Jersey.....	1954	5,671	9,356	15,027	11.7	41,332	3,016	1,539	38.0	401	16.5	9,800	14.3	89.0
	1953	5,514	7,966	13,480	9.0	40,073	2,970	1,517	39.3	423	17.3	9,455	14.2	77.8
Chicago & Eastern Ill.....	1954	2,882	3,336	6,218	4.0	46,034	2,710	1,458	36.4	986	44.2	7,334	17.1	165.4
	1953	3,523	2,839	6,362	6.8	45,992	2,702	1,273	33.7	789	37.8	5,613	17.1	152.1
Elgin, Joliet & Eastern.....	1954	8,014	6,352	14,366	8.3	22,783	2,631	1,401	43.6	225	7.8	13,777	9.0	75.2
	1953	7,325	8,991	16,316	5.0	20,471	2,549	1,355	43.3	217	8.2	15,676	8.5	93.2
Pennsylvania System.....	1954	112,189	91,985	204,174	14.5	52,982	3,089	1,376	32.5	565	28.5	11,641	17.6	177.6
	1953	108,024	96,975	204,999	7.6	51,504	2,956	1,339	32.6	521	27.1	10,762	17.9	72.2
Reading.....	1954	21,374	15,585	36,959	5.4	45,351	3,020	1,547	43.0	451	17.8	12,734	15.0	68.6
	1953	20,893	14,066	35,259	4.4	41,013	2,892	1,446	40.7	443	18.9	12,043	14.2	62.0
Western Maryland.....	1954	8,303	3,415	11,718	2.7	43,802	3,066	1,656	46.2	772	28.5	9,700	14.6	143.5
	1953	8,305	2,613	10,918	3.3	42,833	3,017	1,658	47.7	863	30.7	10,500	14.4	64.2
Chesapeake & Ohio.....	1954	59,837	23,398	83,235	4.2	64,878	3,434	1,849	46.7	942	36.8	15,504	19.0	83.5
	1953	62,554	16,401	78,955	3.3	62,603	3,375	1,811	46.1	879	34.3	13,534	18.6	71.3
Norfolk & Western.....	1954	40,250	5,742	45,992	1.5	73,525	4,396	2,355	50.0	1,042	36.6	22,551	17.2	95.7
	1953	42,308	4,818	47,126	1.0	68,439	3,978	2,098	48.6	900	32.9	19,840	17.5	91.0
Atlantic Coast Line.....	1954	22,956	14,686	37,642	2.6	40,279	2,277	958	32.5	698	40.6	4,733	17.8	121.9
	1953	22,767	15,058	37,825	1.8	39,191	2,314	972	31.7	668	38.9	4,530	17.0	115.5
Central of Georgia.....	1954	3,797	4,620	8,417	5.1	48,278	2,692	1,255	32.2	879	41.4	4,359	18.0	91.9
	1953	4,673	3,346	8,019	3.9	43,399	2,374	1,045	31.1	778	40.4	3,605	18.4	95.8
Gulf, Mobile & Ohio.....	1954	6,759	7,952	14,711	3.0	77,087	3,747	1,736	32.0	1,074	50.6	5,820	20.6	110.1
	1953	7,072	8,681	15,753	3.9	69,630	3,495	1,529	31.5	965	50.9	5,503	20.0	117.7
Illinois Central.....	1954	32,028	18,048	50,076	2.1	46,945	2,757	1,228	32.5	967	49.1	7,548	17.2	68.4
	1953	35,061	18,968	54,029	2.9	43,123	2,507	1,091	32.9	900	47.6	7,501	17.5	79.2
Louisville & Nashville.....	1954	39,518	10,735	50,253	3.4	48,024	2,715	1,331	37.7	777	34.8	8,209	17.7	110.1
	1953	41,892	10,223	52,115	2.5	43,167	2,460	1,199	36.9	901	31.7	7,683	17.6	107.1
Nash., Chatt. & St. Louis.....	1954	4,045	2,935	6,980	3.1	42,645	2,083	926	27.8	779	39.9	5,224	20.5	124.9
	1953	4,502	3,105	7,607	1.9	42,414	2,138	899	29.9	739	41.9	5,174	19.9	125.3
Seaboard Air Line.....	1954	15,996	12,929	28,925	2.2	53,844	2,966	1,304	32.6	928	47.8	6,402	18.4	161.5
	1953	15,080	12,461	27,541	2.2	50,520	2,827	1,200	31.8	872	47.2	5,814	18.1	156.2
Southern.....	1954	18,433	24,924	43,357	5.2	49,411	2,860	1,233	28.8	846	46.8	5,974	17.4	121.5
	1953	18,746	22,991	41,737	3.1	46,012	2,591	1,115	29.0	782	43.1	5,386	17.9	143.3
Chicago & North Western.....	1954	19,449	22,820	42,269	4.4	49,869	2,815	1,271	30.5	648	32.8	5,589	18.2	110.9
	1953	23,137	22,296	45,433	6.4	48,981	2,833	1,280	31.0	571	29.7	5,435	17.6	79.5
Chicago Great Western.....	1954	2,659	3,552	6,211	3.1	43,762	2,727	1,262	29.4	1,151	59.8	4,972	19.5	139.3
	1953	2,514	3,288	5,802	3.6	72,969	3,762	1,584	28.7	1,239	68.0	4,776	19.5	137.6
Chic., Milw., St. P. & Pac.....	1954	37,945	26,443	64,388	5.8	54,189	2,863	1,211	29.7	611	34.4	3,673	19.0	100.1
	1953	39,198	25,196	64,394	5.5	49,449	2,706	1,149	29.1	575	32.0	3,528	18.4	86.7
Chic., St. P., Minn. & Omaha.....	1954	1,152	6,521	7,673	4.4	33,344	2,331	1,035	30.5	691	33.6	3,405	14.5	76.2
	1953	1,169	6,883	8,052	4.8	34,824	2,285	973	29.8	616	32.7	3,238	15.5	77.0
Duluth, Missabe & Iron Range.....	1954	14,551	643	15,194	1.9	22,892	1,571	762	39.8	15	2.1	1,309	15.5	17.4
	1953	14,599	838	15,437	3.8	22,207	1,562	979	50.1	73	2.7	1,988	16.4	18.9
Great Northern.....	1954	23,991	17,822	41,813	2.7	51,685	2,657	1,212	31.9	910	43.1	4,804	19.6	82.7
	1953	26,920	15,284	42,204	3.4	46,918	2,556	1,166	31.0	832	39.5	4,530	18.5	75.4
Minneap., St. P. & S. Sto. M.....	1954	7,762	7,677	15,439	5.2	44,187	2,100	945	29.6	771	40.2	2,788	21.2	119.3
	1953	7,778	5,773	13,551	6.4	37,082	1,810	810	28.4	711	37.3	2,359	20.5	111.3
Northern Pacific.....	1954	20,923	15,396	36,319	5.2	50,945	2,678	1,151	30.5	861	45.7	4,712	19.1	83.5
	1953	24,457	13,254	37,711	4.6	47,961	2,538	1,148	32.4	802	39.1	4,678	19.0	76.5
Atch., Top. & S. Fe (incl. G. C. & S. F. and P. & S. F.).....	1954	58,600	31,908	90,508	3.5	71,683	3,034	1,086	24.4	905	59.4	6,275	23.7	132.2
	1953	57,863	31,007	88,870	3.2	65,209	2,787	995	25.2	897	59.5	5,946	23.5	117.3
Chic., Burl. & Quincy.....	1954	23,184	22,130	45,314	2.5	56,039	2,650	1,114	28.5	946	53.1	4,880	21.2	124.7
	1953	21,397	22,860	44,257	3.1	55,243	2,707	1,157	29.7	983	53.6	4,986	20.5	108.5
Chic., Rock I. & Pac.....	1954	15,208	16,684	31,892	4.6	56,142	2,804	1,137	28.9	1,008	56.9	4,038	20.0	168.4
	1953	14,976	19,543	34,519	3.8	53,966	2,744	1,089	29.5	911				



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4 REASONS...

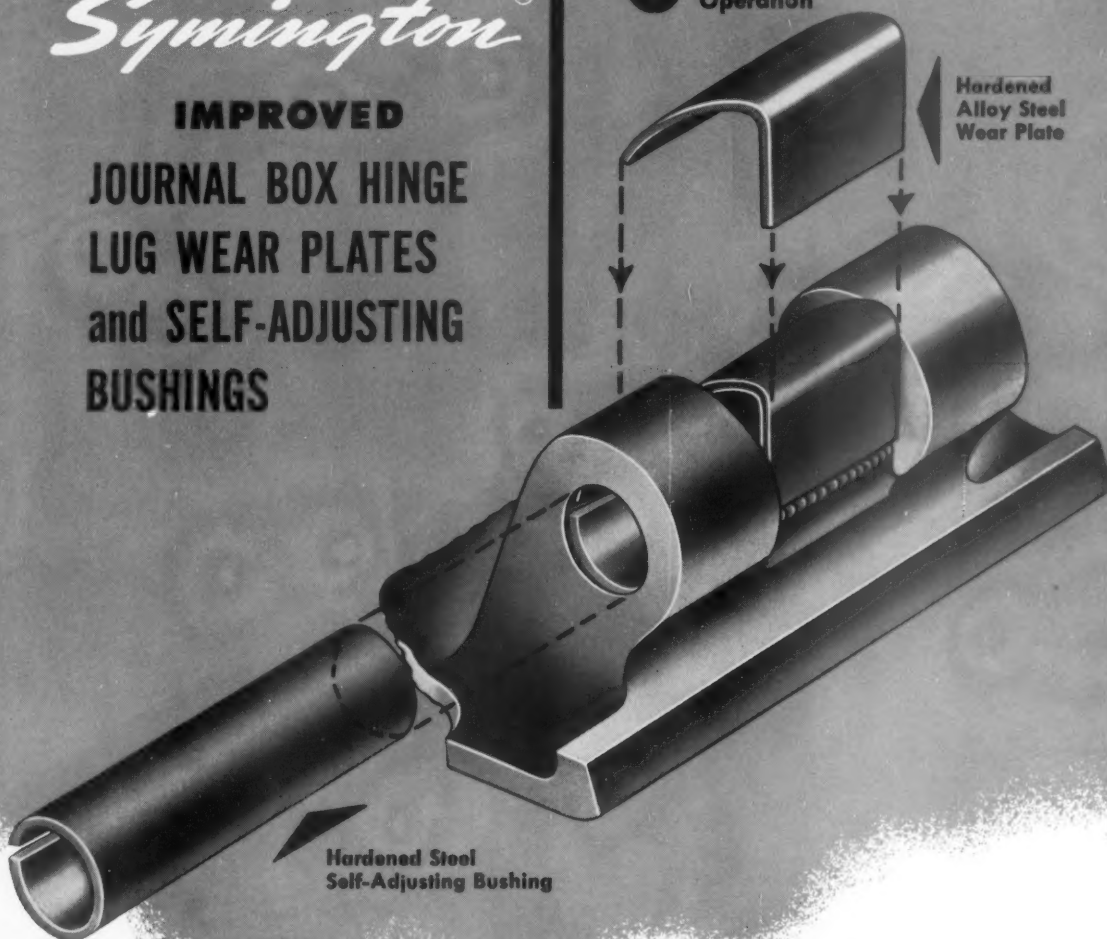
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Symington®

IMPROVED

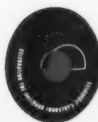
**JOURNAL BOX HINGE
LUG WEAR PLATES
and SELF-ADJUSTING
BUSHINGS**

- 1 Stop Hinge Lug and Pin Hole Wear
- 2 Reduce Journal Box Lid Losses
- 3 Maintain Effective Lid Closing Pressure
- 4 Provide Easier Lid Operation



SPECIFY

hardened alloy steel wear plates and hardened steel self-adjusting bushings be applied to Journal Box Hinge Lugs on all separate Journal Boxes or Integral Box Side Frames for either maintenance or new equipment. They are available and applied by all manufacturers of Side Frames and Journal Boxes.



- ✓ Ship by Rail
- ✓ Travel by Rail

A.A.R. ALTERNATE STANDARD—SEE MANUAL PAGE D-15-A

THE SYMINGTON-GOULD CORPORATION

Works: DEPEW, NEW YORK

New York • Chicago • St. Louis • Boston • San Francisco • In Canada: ADANAC SUPPLIES, LTD., Montreal, Que.







YOU really buy roller bearings to end the hot box problem, cut costs. The Timken® tapered roller bearing is the one bearing you can count on to end the hot box problem and cut operating and maintenance costs to a minimum. It's the taper! Here's why:

1) *No lateral movement within the bearing.* Rollers are made to roll—not slide. Under high unit pressures, lateral movement in straight roller bearings causes sliding and scuffing, shortens bearing life. This is especially true on freight cars when they're dumped and bumped while standing still. It usually shows up in the form of longitudinal surface sliding marks on the rollers and races. Lateral movement also pumps lubricant through the seal and out of the journal box, draws dirt and water in. And auxiliary thrust devices are usually needed to take the thrust loads. These thrust devices are hard to lubricate with grease and expensive to maintain.

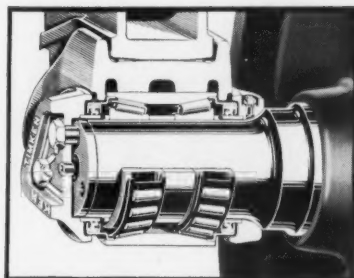
The taper in Timken bearings prevents lateral movement, enables them to take the thrust. There's no scuffing, no pumping action. This means less maintenance, less lubricant, longer bearing life and elimination of the hot box problem.

2) *Positive roller alignment.* The taper provides the forces which hold ends of rollers snug against the rib where wide area contact keeps rollers properly aligned. There's no skewing of rollers to upset the full line contact and shorten the life of the bearing.

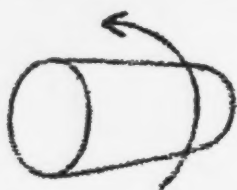
Really get what you pay for when you switch to roller bearings to end the hot box problem and cut operating and maintenance costs to a minimum. Get Timken tapered roller bearings. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

NOT JUST A BALL  NOT JUST A ROLLER  THE TIMKEN TAPERED ROLLER 
BEARING TAKES RADIAL  AND THRUST —LOADS OR ANY COMBINATION 

**THE TAPER MAKES
TIMKEN**
TRADE MARK REG. U. S. PAT. OFF.
THE BEARING YOU TRUST



**The taper makes TIMKEN®
the only journal bearing that
delivers what you expect when you
buy a roller bearing**



**ROLLERS ARE
MADE TO ROLL,**



**THEY ARE NOT
DESIGNED TO
SLIDE.**

*This month Dr. Oscar Horger demonstrates why
Timken bearings always roll without lateral motion.*

